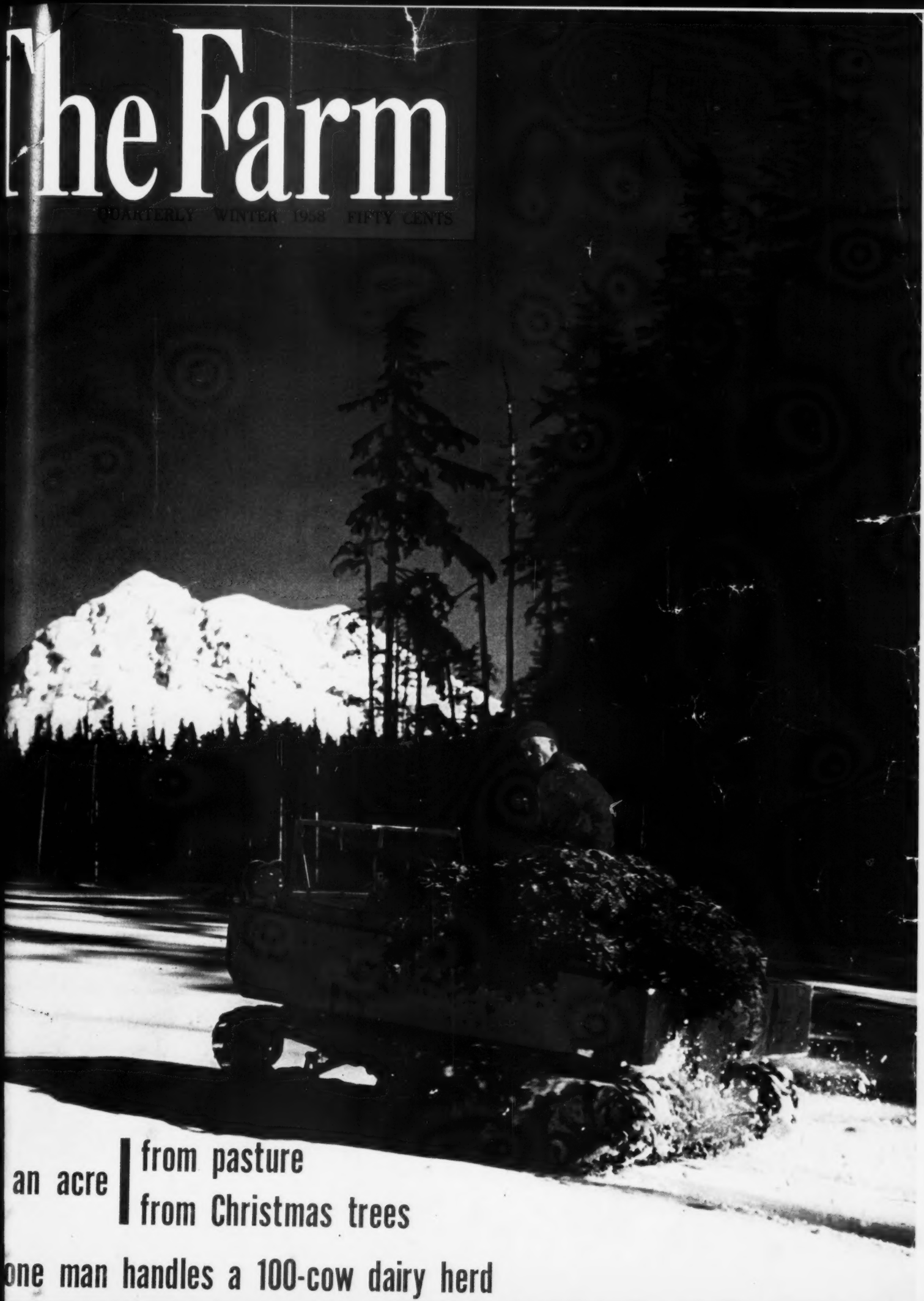
The Farm

QUARTERLY WINTER 1958 FIFTY CENTS



an acre | from pasture
from Christmas trees

one man handles a 100-cow dairy herd

Why secondary discing speeds up with Wedge-*in* action—

Super-Sure-Grip does more work faster, lowers tire costs—

IGHT LUGS increase traction
oser together at shoulders
e-In" grip on all types of
st powerful PULL!
is self-cleaning—helps lugs

ME for better ground con-
eater load capacity.
-longer *ruler-straight* lugs
smoothly—and so wear

fends against bruise-breaks
e-free tire life. Goodyear,
Akron 16, Ohio.

T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

The loose, soft, shifty footing—the dead drag of tandem discers—can make this job an expensive time-killer and fuel-waster.

But Super-Sure-Grip has *ruler-straight* lugs that *converge* at th tires' shoulders! Even the shiftiest footing is squeezed as if in a vise—and you're the boss of plenty of P-U-L-L!

That's Goodyear's exclusive "*Wedge-In*" action. It's constantly ma ing new friends on the toughest farm jobs in our land — and is "power-PULL" reason why survey after survey shows —

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ALL OTHER MAKES *PUT TOGETHER!*

Look for this nearby Goodyear dealer sign for better tire values—better tire care. Convenient credit terms.

GOODYEAR

Super-Sure-Grip Tractor Tires

DEC 9 1957

Official tests prove...

FARMALL® 450 OUTPULLS THEM ALL!

Beat down-shifting! Just pull TA lever to increase pull-power up to 45% *on-the-go!*

Beat slippage! Set Traction-Control lever . . . to get *continuous* traction that grows with the load!

There isn't a row-crop tractor on the market today that will outpull a McCormick® Farmall 450! In recent nationally-recognized tests, the 450 set a new record for drawbar pounds pull . . . outpulling the second-best tractor by a wide margin, and at a higher speed. The 450 also pulled the highest percentage of its own weight of any tractor ever recorded.

This outstanding pull-power is just one of the ways the unequalled Farmall 450 *puts power to better use* . . . helps you turn out more work at less operating cost! Farmers the country over are finding their own proof in day to day performance. They report pulling bigger loads, easier and faster than ever before, with the record-setting Farmall 450.

See your IH dealer soon . . . ask to see the complete results of these official tests. You'll want to try a Farmall 450 on your farm. Make *your own* pull-power tests! See how this great tractor makes you master of your toughest fall plowing . . . puts you rounds and dollars ahead each day!

See Your

INTERNATIONAL HARVESTER Dealer

International Harvester products *pay for themselves in use*—Farm Tractors and Equipment . . . Twine . . . Commercial Wheel Tractors . . . Motor Trucks . . . Construction Equipment—General Office, Chicago 1, Illinois

Your veterinarian...
a specialist in Health Engineering

There is plenty at stake these days in owning and managing livestock. Keeping your animals producing at a profit means, first, keeping them healthy. It also means having a friend as near as your telephone to diagnose—to prescribe—to *prevent as well as treat disease.*

To many, this man is fondly known as "Our Vet." To others who employ him for periodic consultation, he is a specialist in Health Engineering, an adviser in a profitable livestock enterprise. His trained eye can detect symptoms of disease while still in the early, controllable stages. He knows the most effective ways to prevent the spread of infection, to save a valuable animal.

Your part in making Health Engineering profitable

It will pay you to help him in every way you can. One of the most beneficial is to keep accurate health and breeding records for every animal in your herd. This will save precious diagnosis time—help make treatment more effective.

As an expert in Health Engineering, your veterinarian brings to your animals all the latest discoveries of veterinary science—knowledge which can save you many times over the cost of his professional services. Many of the new drugs, for example, are almost miraculous in their effect when administered by a man skilled in their use.

Many of these drugs bear the name E. R. SQUIBB & SONS. It is your assurance of pharmaceuticals thoroughly tested...of proved purity and potency. Nearly 100 years of experience as a manufacturer of precision drugs are behind the Squibb name...a name in which you can unhesitatingly place your trust.

SQUIBB
Veterinary Department
745 Fifth Avenue, New York 22, N. Y.

For prompt, accurate diagnosis, always consult your veterinarian.

Ask your veterinarian about
SYNOVEX®
STEER FINISHING IMPLANTS

Get higher weight gains at lower cost per lb. of gain with no down-grading of carcass quality.
SYNOVEX is a registered Squibb trademark.

SQUIBB QUALITY—THE PRICELESS INGREDIENT

Farm Quarterly, Vol. Twelve, No. Four. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by F. & W. Publishing Corp. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the United States and Canada. Entered as second-class matter at the Post Office, Cincinnati, Ohio, under the Act of March 3, 1879. (Title Reg. U.S. Pat. Off.)

That's why more farmers use NEW IDEA Spreaders than any other make

SHRED FINER because . . . they have blade-like U-teeth, triple staggered to give finer shredding.

SPREAD WIDER because . . . they have strong, scientifically designed, replaceable paddles to slice manure and deliver a wider, more uniform pattern.

LAST LONGER because . . . they have been built to rigid standards after torture-track and on-farm testing.

The power spreader farmers asked for. NEW IDEA 95-bu. PTO model. Has clutch for easy cleanout. Exclusive features include slanted rear arch, dual purpose control lever, phenolic fiber bearings, and a full year guarantee.

Giant of the New Idea spreaders. 125-bu. PTO model has new clutch for easy cleanout. Triple-staggered U-teeth give extremely fine shredding. 18 new features for extra strength, longer life. Full year guarantee.

Huskiest, biggest ground driven spreader. 95-bu. model has slanted rear arch, bigger upper cylinder for better spreading. Long life features include full length steel flares, steel front endgate, water repellent Penta-treated box. Full year guarantee.

Lowest cost, high quality spreader. Ground driven 70-bu. model. For long life, box strengthened with steel flares and steel endgate. Full year guarantee. Available with hubs or barefoot at extra low cost. 4-wheel, tractor or horse-drawn 70-bu. spreader also available.

--------Look at New Idea spreaders before you buy--------

NEW IDEA FARM EQUIPMENT CO., DIVISION **Avco** DISTRIBUTING CORP.

Dept. 459, Coldwater, Ohio

Please send free literature on the spreaders checked:

- ☐ 125-bu. PTO
- ☐ 95-bu. PTO
- ☐ 95-bu.
- ☐ 70-bu.
- ☐ 75-bu. 4-wheel
- ☐ Booklet "Manure Handling"

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Address_____

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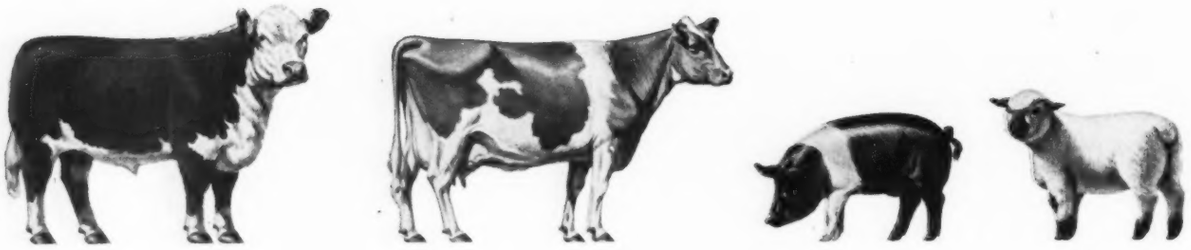
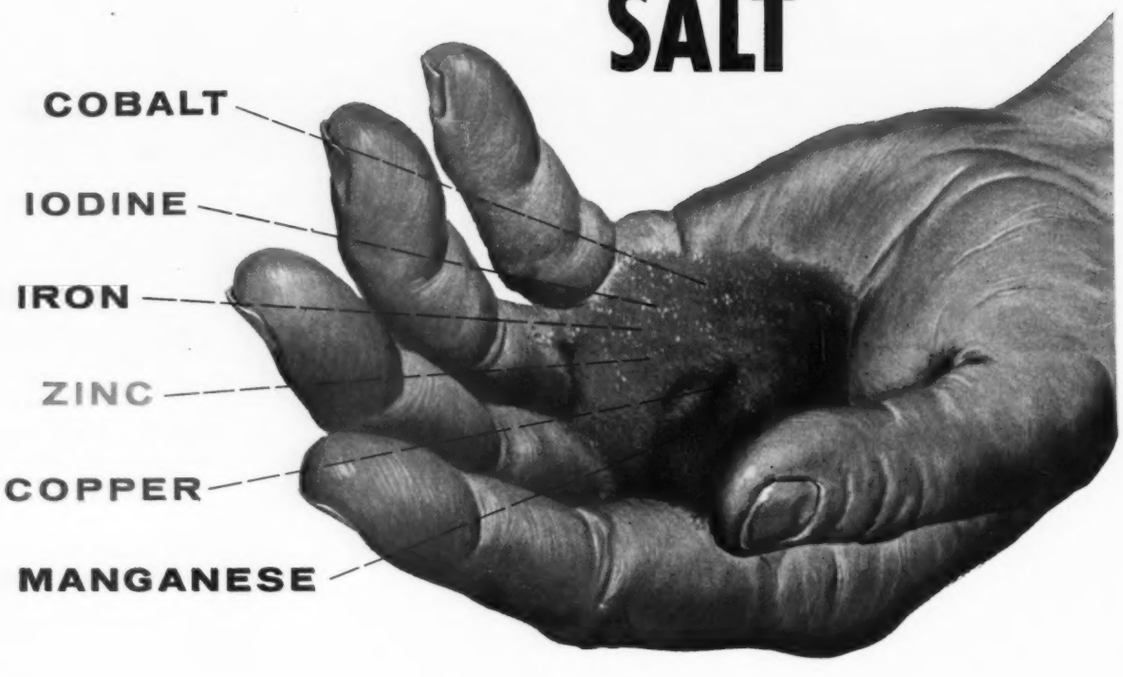


Wherever you raise livestock...they need

MORTON

Trace-Mineralized

SALT



Wherever you raise livestock—beef cattle, dairy cows, hogs or sheep—chances are your feeds are short of trace minerals, at least some of the time. Prolonged drouth or excessive moisture can prevent grass and crops from drawing trace minerals from the soil. And many areas are known to be definitely short of certain trace minerals.

Morton Trace-Mineralized Salt, fed free choice, is the sure way to get better results from your feeding program. Your animals get the six essential trace minerals they need along with the salt they eat every day. And those trace minerals boost the feeding value of all your other feeds.

Morton T-M Salt can do so much for livestock health . . . and it costs so little . . . that it just makes plain common sense to feed T-M regularly. Why take chances on costly deficiency diseases? Why not get more meat, milk and wool? Feed Morton T-M Salt, free choice, even if you feed a major mineral. Morton T-M Salt is made with special trace minerals of superior quality. Only Morton has the exclusive right to use *all* these top quality ingredients. This makes Morton T-M the finest product of its kind. Use no other brand. At your feed dealer's—bags or blocks.

MORTON SALT COMPANY
Chicago 3, Illinois

Increase Your "Farming Reach"...

GO 6-ROW WITH JOHN DEERE

Cut Time, Labor, and Fuel Costs in One Wide Sweep

It's another John Deere first—a new way of farming to help you meet head-on and whip those bugaboos of bad weather, limited working time, and mounting labor and fuel costs—new John Deere 6-Row Farming Equipment teamed up with Modern John Deere Tractor Power.

With your farm geared to 6-row operation, you can be assured of keeping in stride with today's stepped-up farming pace. You can count on cutting fuel costs and working hours by as much as 1/3 and increasing the efficiency of power and labor by as much as 50 per cent. And it is all bound to show up in a lower figure on the cost side and a higher figure on the profit side when the tally is taken at the season's end.

John Deere 6-Row Farming Equipment includes both planters and cultivators—designed to increase your "farming reach" at the same time that you sink costs to bedrock and squeeze every extra profit dollar out of every harvest.

So, go 6-row! Combine the eager, aggressive power of a Modern John Deere Tractor and the wide, hungry span of new John Deere 6-Row Equipment and put yourself in the forefront of today's stepped-up farming pace.

Ask your John Deere dealer for a demonstration and for information on the John Deere Credit Plan that will make it easy for you to own new John Deere Power and Equipment.

The width of the 6-row cultivator (large picture) can be narrowed for easy transporting or cultivating crops planted with four-row planters.

John Deere 6-Row Equipment includes corn planters, corn and cotton planters, and bedders, all available with attachments to increase their utility.

FARMING SPREADS ITS WINGS

with JOHN DEERE POWER and NEW 6 ROW EQUIPMENT

SEND FOR FREE LITERATURE

JOHN DEERE • Moline, Ill. • Dept. V54

Please send me information on the items checked.

- ☐ 6-Row Corn Planter
- ☐ 6-Row Cultivator
- ☐ "620" and "720" Tractors

*Name*_____ ☐ *Student*

*R. R.*_____ *Box*_____

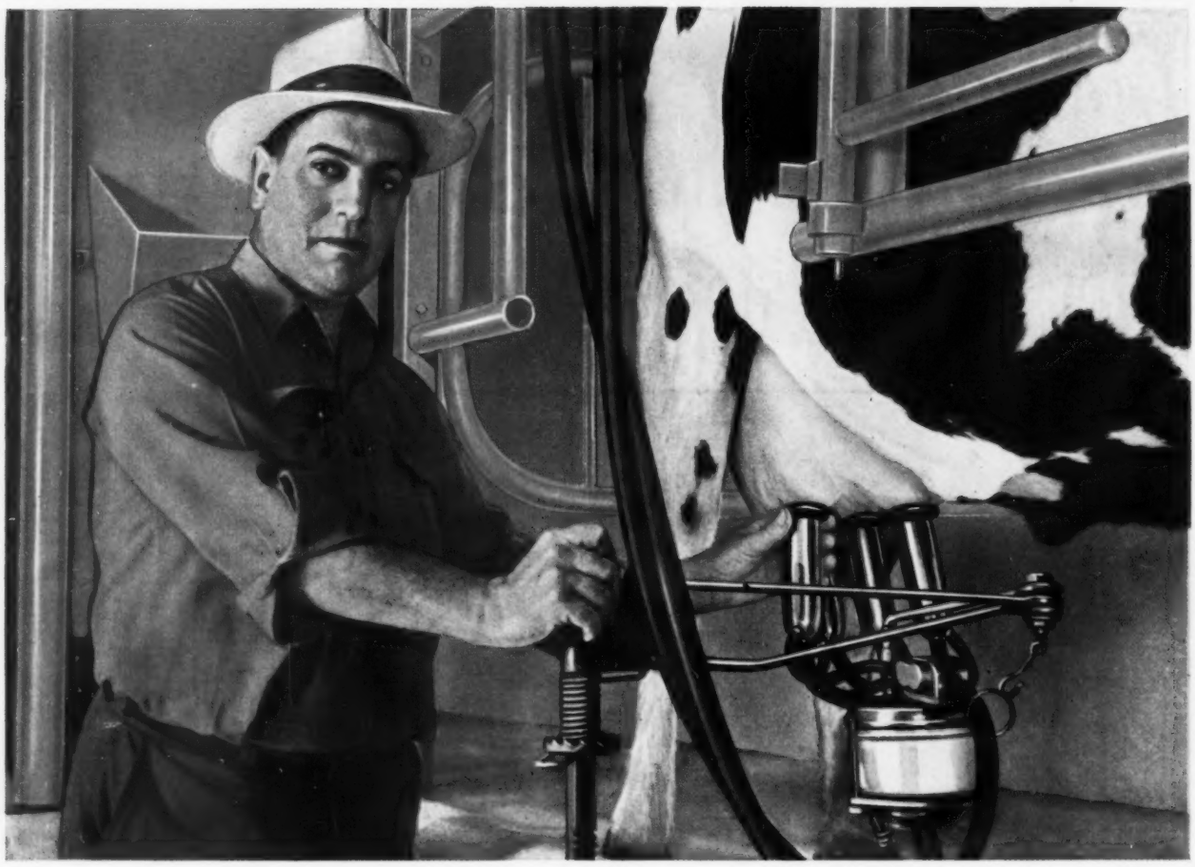
*Town*_____

*State*_____

JOHN DEERE

JOHN DEERE

"Wherever Crops Grow, There's a Growing Demand for John Deere Farm Equipment"



Sure! Genuine Surge TUG & PULL cow milking may cost you a few cents more a day than Claw-Type cow milking...but...

Hundreds of thousands of careful men have spent the extra money to get Surge Milking because they thought that it was better than claw-type milking.

If the milk claw has been abandoned to such an extent that few, if any, of the late model bucket milkers have a claw, what real reason is there to hope that you will be happy with a milk claw on a pipe line milker?

Parlor — Pipe Line or Bucket — no Surge has ever had a milk claw, so there is no claw riding with a Surge.

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All kinds of Surge Milkers are sold on EASY TERMS . . . a low down payment and up to 24 months to pay the balance.

BABSON BROS. CO.

2843 W. 19th Street • Chicago 23, Ill.

SURGE

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PLEASE RENEW MY SUBSCRIPTION TO:

THE FARM QUARTERLY

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POSTAGE WILL BE PAID BY

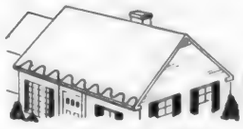
The Farm

22 East 12th Street
Cincinnati 10, Ohio

HEATING CABLE SETS
solve many farm problems

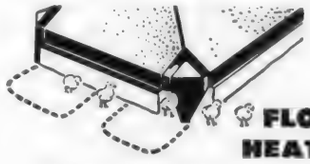
PIPE HEATING

The simple installation of a G-E heating cable set around exposed pipes, valves, and pumps keeps them from freezing even in the coldest weather. Typical uses are to protect piping that supplies drinking water to animals, to guard sprinkler systems in cold locations.



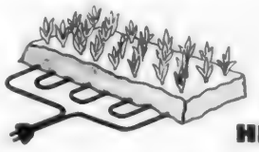
DE-ICING

Along roof edges and in gutters, G-E heating cable sets prevent build-up of ice dams that can cause destructive leaks when snow is melting away. Also useful for de-icing gutters and downspouts and to prevent accumulation of snow or sleet on garage aprons, walks, steps.



FLOOR HEATING

G-E heating cable sets for poultry brooders result in faster, healthier growth with much lower mortality. There is no crowding for heat, all chicks are in full view, feeders and waterers are easily accessible. Also ideal for floor heating in kennels and other buildings.



SOIL HEATING

Now it is easy and economical to have a successful hotbed or cold frame, without need for troublesome manure bedding or expensive steam or hot water systems. A General Electric heating cable set, buried in the soil, keeps the soil at the ideal temperature for germination and the early growth stages.

G-E heating cable sets come ready to install in lengths of 26, 30, 40, 60 and 100 feet with ends assembled into a weatherproof plug . . for 115 volts. Also 120-foot sets for 220 volts.

Can be used with thermostats to provide close, automatic regulation of temperature, or they can be operated by direct switching. Detailed application and installation instructions are packed with each set. For complete information, see your hardware or farm equipment dealer, or write to Wiring Device Department, General Electric Co., Providence 7, R. I.

Progress Is Our Most Important Product

GENERAL ELECTRIC

The Farm QUARTERLY

Winter, 1958, Volume 12, No. 4

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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Farm Quarterly is published Spring, Summer, Autumn and Winter. Price 50c a copy; $2.00 a year, $3.50 two years, $5.00 three years. Add $1 per year for countries outside USA and Canada. Send check to Farm Quarterly, 22 East 12th Street, Cincinnati 10, Ohio.

Spring issue on sale Mar. 6 at all Class A newsstands.

Bob Holub, Firestone Store manager, delivers a "loaner" to Fred and John Ullmann.

"WITH FIRESTONE FREE LOANERS WORK TIME IS NEVER LOST,"

say Fred and John Ullmann, Johnstown, Colorado

Firestone's *free loaner* service makes a big hit with Fred and John Ullmann, who rate high among Colorado's leading sugar beet growers. The instant tire trouble develops, a call to their Firestone dealer, Bob Holub of Longmont, Colorado, starts him on the way with Firestone *free loaners* to keep equipment rolling while other tires are being repaired or retreaded.

Here is what the Ullmann brothers say about Firestone service: "For our money, you can't beat Firestone on-the-farm service . . . particularly the *free loaner* service. We never lose a bit of work time because the loaner tires go on the same time others come off the rims, which keeps equipment on the job. It's that special kind of service that sold us on Firestones."

The Ullmann brothers, like the majority of farmers, have found that Firestone service and quality Firestone tires are their insurance against downtime due to tires.

See your Firestone Dealer or Store today. Turn down-time into work time with Firestone *free loaners*.

Enjoy the Voice of Firestone on ABC television every Monday evening.
Farm-City Week, November 21-28 (Farm and City—Partners in Progress)

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1957, The Firestone Tire & Rubber Company

NOW! Syncro-Zymic

SYNCHRONIZED NUTRIENT ACTION

WAYNE HOG FEEDS...

Hogs from the Wayne Research Farm consistently top the Chicago market.

geared up to help you

Market Your Hogs 2 Weeks Earlier!

Plus the additional benefits of

ARSANILIC ACID and HYGROMYCIN

Now . . . Arsanilic Acid to help you fight scours and Hygromycin for worm control . . . teamed with Balanced Nutrient Action for the most effective hog feeding program ever.

Wayne Tail Curler—A palatable pig starting feed that speeds pigs to heavier weaning weights faster than ever! Syncro-Zymic Wayne Tail Curler contains both Arsanilic Acid and Hygromycin.

Wayne Pig Balancer—A specially fortified supplement that grows pigs and shoats rapidly and economically. Properly balances farm grains for fast, low-cost gains. Has Arsanilic Acid and is available with or without Hygromycin.

Wayne Hog Balancer—A powerful supplement with Balanced Nutrient Action to finish hogs fast for earlier marketings. Supplies nutrients lacking in farm grains at low-cost.

Your Wayne feed dealer also has special feeds for special needs. See him for the complete line of Wayne Sow, Pig and Hog Feeds.

● Hog feeding benefits never before thought possible . . . now yours in Wayne Syncro-Zymic Hog Feeds, an exclusive Wayne Research development.

In two years of extensive tests, these Syncro-Zymic formulations (in comparison with very good hog rations) produced faster gains that sent hogs to market 2 weeks earlier . . . gave greater feed efficiency (as much as 10% less purchased feed and ⅔ bu. less corn per hog), more uniform weights and resulted in extra profits of as much as $1.00 to $1.50 per hog.

Syncro-Zymic benefits are in every bag of Wayne Hog Feeds—Tail Curlers, Pig Balancer, Hog Balancer, Brood Sow Supplement and all other Wayne Hog Feeds—*at no extra cost to you.*

For earlier marketing, faster gain at lower cost, greater net profits...ask your feed dealer now for NEW Syncro-Zymic

WAYNE FEEDS

Allied Mills, Inc. Builders of Tomorrow's Feed . . . today

Executive Offices: Chicago, Illinois Service Offices: Fort Wayne, Indiana

RE-RING FOR SPRING!

Now is the time to re-power your farm engines by installing PC 2-in-1 chrome piston rings

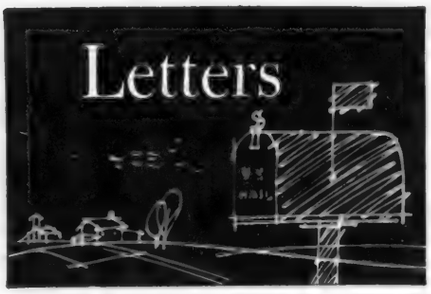
It's a grand and glorious feeling to know that your farm engines are in tip-top condition—ready to do their powerful best work—when spring rolls around again. That's why it's smart to prepare for next year's farming right now by installing Perfect Circle 2-in-1 Chrome piston rings.

Perfect Circles perform better under the rugged demands of farming because both the top rings and the oil rings are plated with thick, solid chrome that resists wear—*more than doubles* the life of cylinders, pistons and rings. This means more work time—less shop time! For sustained power with lasting oil economy it pays to install PC 2-in-1 Chrome piston rings with every engine overhaul! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ontario.

PERFECT CIRCLE

2-in-1 CHROME PISTON RINGS

The standard of comparison



Ve Get Too Soon Old

Sirs:

James David Frye is truly a remarkable man if, as you say (Autumn issue, page 90), he was born in Concord, Vermont, in 1886 and installed his last scale at 84 years of age. He has truly outlived his years.

Dr. A. J. Thompson
Hutchinson, Minnesota

Our mistake. Mr. Frye was born in 1868 and our proofreaders failed to pick up the transposition of the 6 and 8.

Malabar Malaprop?

Sirs:

In your "Over the Back Fence" in your Autumn issue you discuss Louis Bromfield and you state that "good farming pays."

Presumably Mr. Bromfield would fit into that category. But in my book you'll have to come very quickly to Mr. Bromfield's rescue. For shortly before Mr. Bromfield's death the *Watertown Times* of Watertown, N. Y., commented editorially on how Mr. Bromfield could and did get out of "milk" farming when the going got tough, but the rest of us garden variety of dairy farmers had to stay.

Mr. Bromfield was my hero, too, nor do I intend to disparage him, but his luster dimmed considerably when I found that he couldn't meet the economic challenge of the present times. After all, that's my test of a successful farmer.

Joseph P. Doboze
Norfolk, New York

Draft Horses

Sirs:

An article on "Draft Horses" would make a very good item in your magazine. There are very few farmers who couldn't use a good team a large part of the year instead of an extra tractor. Nine out of ten of them have to borrow the money to buy the extra tractor and work off the farm to pay for it, cutting some other fellow out of a job. Then, in turn, they raise more grain, produce more milk and meat and wool to be stored at high cost to everyone. Most farmers can enjoy working a good team, too, and have something to be proud of.

Here in our part of the state the interest in good horses has been on the increase the last few years. In New Wilmington, Pennsylvania, we have a man who is a registered Jersey breeder who does all his farming with six Belgian horses and a registered stallion; down in Beaver County, we have a Guernsey man who does all his farming with horses. We live in an Amish settlement which is all farmed with horses.

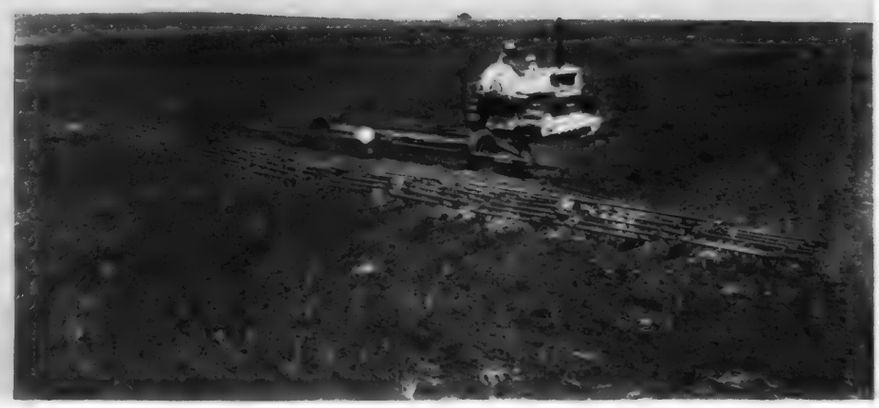
The Crawford County Fair at Meadville, Pennsylvania, had over 100 draft horses this year. At the Mahoning County Fair at Canfield, Ohio, we had the show barn full and a tent besides. Ohio State had a good show and last January we had a very large entry and a very nice show at Harrisburg, at the State Farm Show.

E. C. Hogue
Mercer, Pennsylvania

(*Continued on page* 127)

Hiniker Bros., Mankato, Minn. make a business out of farming...

they apply factory-like mass production techniques such as pulling 42′ field cultivators, 38′ tandem disks, 8–16″ plows with their CAT* D6 Tractor, while their D4 pulls a 70′ harrow, 24″ packer, etc.



The key to making a profit out of any farming enterprise is volume production at low cost. Cat Diesel Tractors can bring you the assembly-line production system necessary to put your farm on a business basis. One man on the seat of a Cat Diesel Tractor – any size – can do the work of many men and ordinary tractors handling routine farm jobs such as seedbed fitting and harvesting.

Preliminary groundwork frequently must be completed before farming can be put on a production line operation – removal of fence rows, ditches, consolidation of fields, land clearing, draining, forming. These, too, are jobs for a Cat Diesel Tractor. Have your Caterpillar Dealer analyze your farming operation and recommend the power you need!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

CONSERVE MANPOWER, SOIL AND WATER WITH CAT DIESEL TRACTORS

"FOR SPEED AND SAVINGS

WE COUNT ON OUR EATON 2-SPEED AXLE!"

—SAYS FARMER DONALD BOEBEL, NAPERVILLE, ILLINOIS

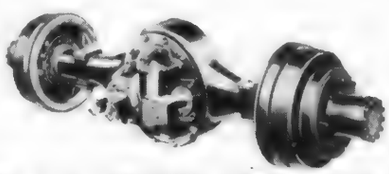
"We have to move fast when crops are ready to harvest," reports Mr. Boebel. "If we're delayed, a hard rain or a high wind could ruin our grain. That's why our GMC truck with an Eaton 2-Speed Axle is so important. The Eaton 2-Speed prevents delays . . . saves hours and dollars that really add up.

"During the soybean harvest, our truck averages seven trips a day, week after week. We know what to expect—smooth, sure pulling power from Eaton's low-gear range that gets a full load through. Even in soft ground, when our Eaton-equipped truck moves slow enough to keep pace with our combine, we don't have to worry about stalling and bog-downs.

"Since 1948 Eaton-equipped trucks have done all our hauling work. Yet, we've never had to replace a clutch or a motor part, never needed any maintenance work on an axle. Hauling grain in the field to the elevators, or carrying cattle over the road to Chicago, an Eaton-equipped truck always gives us the best economy and performance. We couldn't manage without an Eaton 2-Speed Axle."

"TOP LEGAL SPEEDS on the highway are assured—thanks to Eaton's high-gear range," adds Mr. Boebel. "Engine RPM and gasoline consumption are at the minimum, too. In close city traffic, the Eaton 2-Speed makes a truck more maneuverable—there's less transmission shifting to do, more gradual stops and starts."

"EATON CUSTOMERS always come back," says Mr. Clyde C. Netzley, GMC truck dealer in Naperville. "Once a farmer has experienced the advantages of an Eaton 2-Speed Axle, he won't take anything but another Eaton-equipped truck. My customers tell me an Eaton 2-Speed pays for itself in longer parts life, in less maintenance and repair expense."



EATON 2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

Eric B. Beckeman, Pennsylvania-Registered Professional Engineer and owner of Beckeman Engineering Sales.

"ENGINEERED IRRIGATION STARTS RIGHT HERE"

"Applying an inch of water to a single acre requires 27,154 gallons. And, as you know, the total amount of water needed varies with the kind of crop. The average is two inches or approximately 54,000 gallons per acre every ten days from seeding through harvest.

"This imposes the most exacting demand upon the pumping equipment for dependable, trouble-free service. For example, the pump in this system operated six hours, or more, each day for 65 days during a drought. Its delivery rate is 960 gallons per minute at 120 pounds pressure. The application in a tree nursery is unusual, but it definitely shows the pump's importance.

"The proper water supply, we consider the most important factor in engineering an irrigation system. We regularly specify Gorman-Rupp Pumps because of: (1) assurance of dependable and efficient performance, (2) design advantages for the pump user, (3) adequate selection of sizes and driving power for every size of irrigation system."

SYSTEM SUMMARY
(With reference to the pump shown above.)

Crop and acreage: Nursery Stock, 75 acres.

Gorman-Rupp Irrigation Pump: Model 55M-IND56A.

Other equipment: 2,000 feet of main-line 6" aluminum pipe; 4,000 feet of 4" lateral lines, in a duplicate system; 24 sprinklers of 40 gpm in each system. Sprinkler spacing is 80 feet. Pipe spacing, 100 feet.

Date installed: June 15, 1957.

Other details on request.

THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

A LOW-COST ANSWER TO HIGH FEED COSTS

BUTLER
"Packaged" Feed Mill

Here's a low-cost way to combine the economy of farm-grown grains with the efficiency of supplements and concentrates to cut your feed costs. This Butler "package" gives you everything you need for a complete on-the-farm feed grinding, mixing and storage program: an elevating leg to handle grain and supplements mechanically, Butler bulk tanks for safe storage and a Butler Select-O-Mix® mixer-grinder that processes feeds automatically.

Just set the dials. Select-O-Mix automatically proportions and grinds feed and concentrates at 1,200 lbs. per hour. Handles four ingredients simultaneously, runs and shuts off without operator supervision.

Besides making more economical feeds, this mill makes important savings in time and labor. It minimizes shoveling, bag handling and spillage, permitting fewer men to feed more livestock. It eliminates the cost of trucking grain into mills or waiting for portable mixers. And it assures you of a steady source of fresh feed—properly mixed to eliminate flour and wastage.

Butler offers this feed mill "package" in a number of sizes and arrangements to meet individual requirements. The price is well within the range of most livestock operations. Get the complete story—mail coupon today for the important details.

BUTLER STEEL PRODUCTS

Manufacturers of Farm Equipment
Buildings • Oil Equipment
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Factories at Kansas City, Mo.
Minneapolis, Minn. • Galesburg, Ill.
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For prompt reply, address the office nearest you

BUTLER MANUFACTURING COMPANY

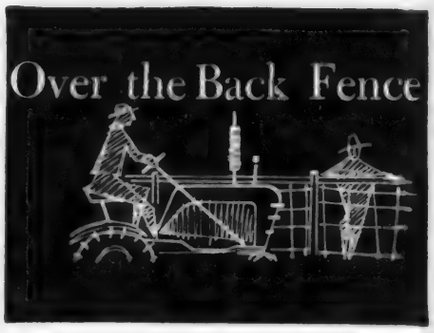
Dept. 378, P. O. Box 7027, 1020 E. 63rd St., Kansas City 26, Mo.
978A Sixth Avenue, S.E., Minneapolis 14, Minnesota
921 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 78A, South 27th St. and Butler Ave., Richmond, California

Please send drawings, prices and full description of Butler "Packaged" Feed Mill for farms.

Name .....

R.F.D. or Street .....

Town ..... **State** .....



It's Come. Farm Problem Solved Two new solutions of the farm problem popped up recently and we are going to pass them along for what they are worth. At Sioux Falls, South Dakota, on October 10, Secretary of Agriculture Ezra Taft Benson was pelted with surplus eggs by an audience of farmers. We assume that the eggs were surplus because no South Dakota farmer would throw away an egg he could sell. The second solution will not only solve the farm income problem but the pest problem as well. We're losing the battle with insects anyway. Below are listed some delicacies you can buy in big city delicatessens or order from Mrs. Dorothy Damar, Damar Bldg., Elizabeth, N. J.:

FRIED GRASSHOPPERS. Crunchy, munchy, ready to serve. A hostesses' delight. 1-1/5 oz. 67c

YOUNG ROASTED CATERPILLARS. Hand-picked, plump caterpillars roasted to flavorful best. 1-1/5 oz. 98c

SPARROW ON A SKEWER. Juicy, plump sparrows, broiled to a rich, brown goodness $1.25

CHOCOLATE COVERED ANTS. Tasty, crunchy ants covered with thick, rich milk chocolate $2.00

Take that grasshopper item—my uncle, who operates a dry farm in western Kansas, estimates that there'll be several tons per acre on his farm in a good grasshopper year. At 67 cents per 1⅕ ounces that would make a pretty figure. Sell your grasshopper crop; to hell with corn, and wheat, and hogs.

What's Spat We'll bet you didn't know that oyster eggs are known as spat. We've tried it out on a lot of our better informed friends and drew 100 per cent blanks. We ran across the word in Holland where a good many Dutchmen are engaged in oyster farming, a form of livestock operation not likely to become popular in this country because of lack of suitable conditions. An oyster farmer is permitted to put out 5000 tiles, each covered with a lime coating, in the sea near the dykes in spots the adult oysters are known to frequent. The spat falls on the tiles, develops into small seed oysters in about three months. These are then sold to breeders or exporters who plant them on their leases and wait until they grow big enough for eating. This takes three or

(*Continued on page* 126)

Will you and your family be farming . . . tomorrow?

Yes . . . if you take a businesslike approach to the use of your time, energy, and money. But you may need better tools.

You may have wondered whether farming will become too complicated, too technical for family-type operation. Thanks to the far-sighted planning of a small group of 20th-century pioneers, you and your children can continue to look forward to prosperous farm living . . . *if you organize your time, energies, and resources in a businesslike way.*

Thirty-eight years ago a handful of farm-reared men dedicated their lives to the task of finding a way to make family-owned and operated farms more efficient and profitable. Today, these men head a unique organization called the Doane Agricultural Service, with headquarters in St. Louis and 32 branch offices throughout the United States and Canada. Out of 38 years of practical, hard-headed, profit-minded experience, this solid organization of farm-minded men has worked out, and is constantly improving, a formula for prosperous, family-type farming in the highly technical world of today and tomorrow.

Truly profitable farming today calls for more knowledge, more skills, than one man normally can master. This is why Doane has grown so swiftly in recent years. *You* do the things you can do best, and use the trained services and practical know-how of specially trained Doane experts where *they* pay off best.

Here are some of the ways farm families must operate if they are to prosper and continue to enjoy the many benefits of farm life:

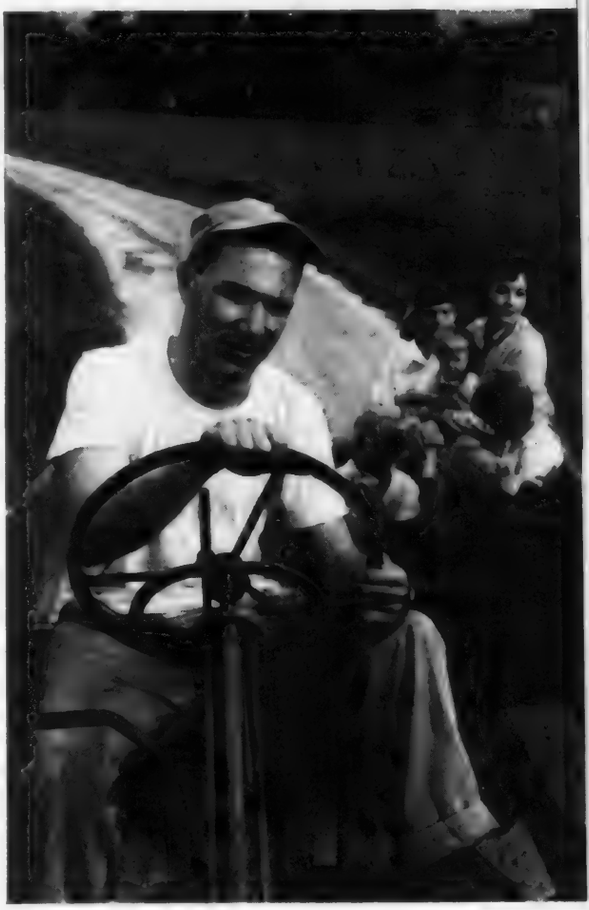
Successful farms are managed like a business

When to sell and when to buy is just as important as when to sow and when to reap. On today's competitive market a penny or two more or less per pound or bushel can be the difference between profit or loss. The question is: Can you . . . a busy farm producer . . . also be a marketing expert?

It requires a full-time staff of trained farm economists at Doane to find, organize, digest, and interpret the mounds of facts, reports, and statistics that show where profit opportunities lie. This service, along with valuable "how to do it" information, is available to you *for less than the price of a daily newspaper.* Here is one simple tool which business-minded farmers can use to keep up with changing market conditions.

Today's successful farmer must specialize in production. He concentrates on what he can do best, and uses the services of other specialists to round out his business . . . at a fraction of the cost of doing it poorly himself. Hundreds of farmers and farm owners have turned to the Doane Agricultural Service for help. Aided by Doane farm managers, they quickly and efficiently make the changes and adjustments to modern conditions without giving up their freedom of action. In fact, they *free* themselves to make their own specialties really pay off. Others, at the suggestion of a Doane expert, turn to one of the other Doane Services which better suits their needs.

Efficient farms must be engineered. Farm buildings are not an end in themselves. To be truly efficient they must be a vital cog in a money-making management plan. They, too, must earn money. For years, Doane engineers and farm managers have carefully selected responsible builders at strategic farm locations. These organizations have been trained to fit scientifically designed Doane farm buildings into a labor-saving, smooth-flowing management operation. This is done through advanced design rather than expensive mechanical gadgets. Built-in flexibility allows you simply and easily to adjust Doane-designed buildings to changes in your operation, and to take advantage of new principles of efficient farming.



DOANE AGRICULTURAL SERVICE, INC.
5142 DELMAR BLVD., ST. LOUIS 8, MISSOURI

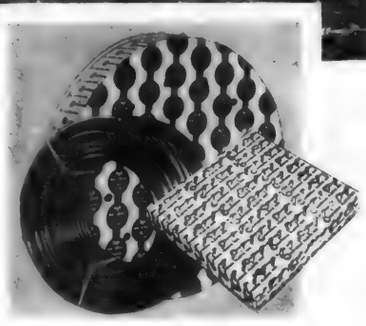
to help you build soundly for tomorrow:

CONSIDER THESE SPECIAL DOANE SERVICES

- **Farm operating programs**—prepared for farms or ranches managed by their owners.
- **Farms and ranches managed**—for non-resident owners.
- **Farm problems**—consultation, study and solution.
- **Farmstead work-simplification planning**—to cut labor, increase efficiency.
- **On-the-farm consultation**—check the farm program and methods and recommend improvements.
- **Doane Agricultural Digest**—twice-monthly business and marketing information prepared for Doane farm managers, farm owners, operators and businessmen.
- **Doane Authorized Builders**—trained to provide the latest practical farm buildings designed to reduce labor and cut costs of production.
- **Appraising**—for inheritance tax, condemnation, purchase, sale, and long-term income value.
- **Farm-use products tested**—for manufacturers to determine performance under practical farm conditions.
- **Marketing research and consultation**—new products, potential sales, trends in agriculture, sales methods and organizations, and market analysis.

Detailed information will be sent you upon request. Please send your inquiries to address shown. There is no obligation of any sort.

Can I afford to irrigate?



If you've been asking yourself this question, you probably feel, as do most farmers, that *you can't afford not to irrigate.* But perhaps the initial cost of the equipment is holding you back. If so, it's time you investigated USS NATIONAL* Polyethylene Pipe. Not only is this plastic pipe priced to fit your budget, but it's a labor-saving cinch to install . . . a one-man job.

NATIONAL Polyethylene Pipe is flexible—can be run around corners and over obstructions. It's lightweight—can be carried in a roll like hose. And it's tough—resists rot, corrosion, acids, alkalis and most chemicals. Moreover, it retains its toughness and flexibility in extreme temperatures, from –90°F. to +120°F. Available in ½-inch to 6-inch diameters.

NATIONAL Polyethylene Pipe comes in lengths up to 400 feet. It is made of 100% virgin polyethylene compounded with 2¼% carbon black to prevent deterioration from ultraviolet rays. Its smooth inner surface offers low flow resistance, inhibits chemical deposits.

NATIONAL Polyethylene Pipe is also perfect for sprinkler systems and stock watering lines—in fact, all cold water utility lines around the farm. For more details on the many uses of NATIONAL Polyethylene Pipe, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Ask for Bulletin No. 29.

*Trademark

This seal of the National Sanitation Foundation means Tested . . . Approved . . . Sanitary!

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS NATIONAL **Polyethylene** PIPE

UNITED STATES STEEL

Farm Books

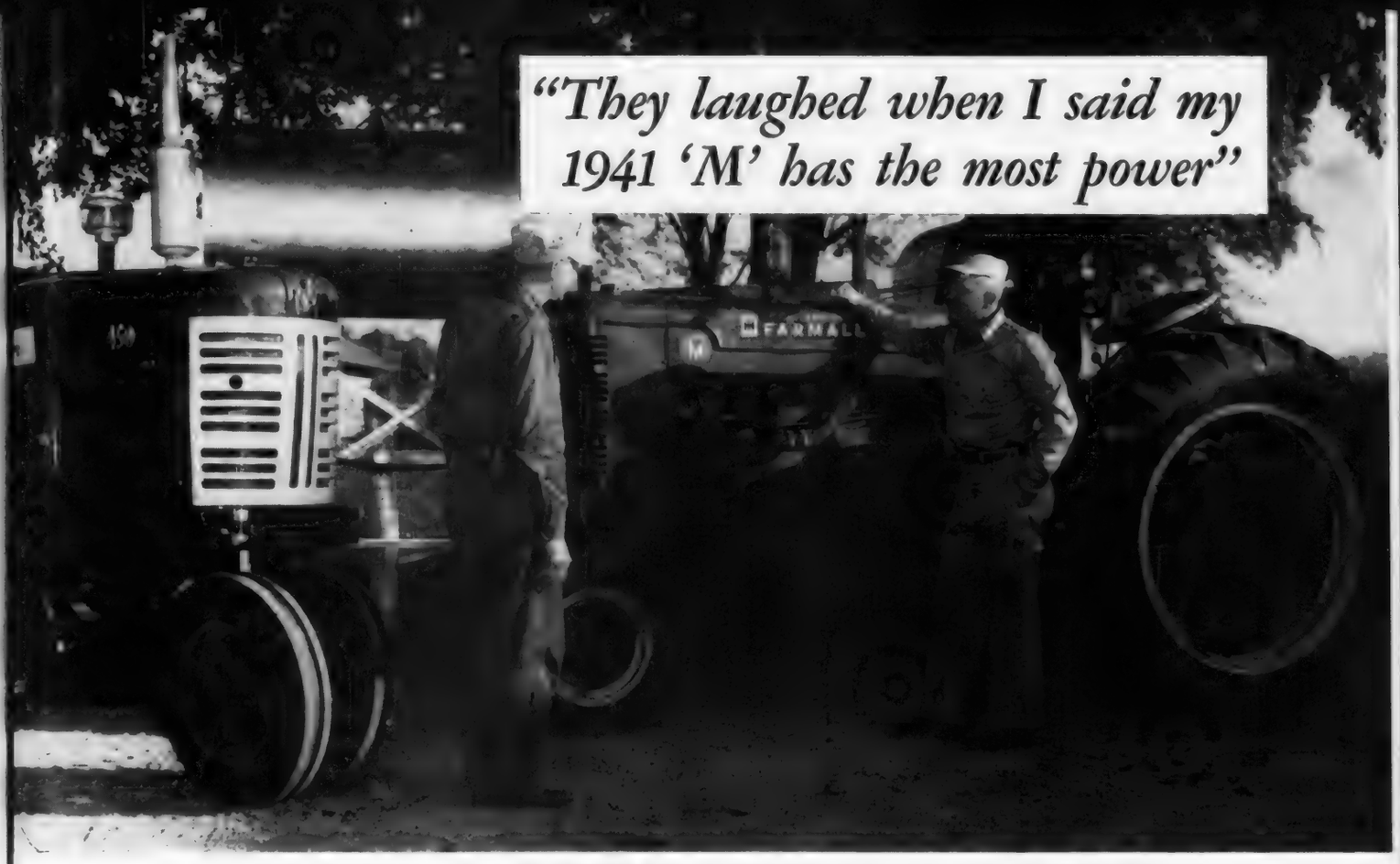
A Concept of Agribusiness, *by John H. Davis and Ray A. Goldberg. Harvard University Press, Boston. $6.00.*

Agribusiness is a newly coined word and as such it has a gawky, awkward sound. It is not a bastard word, however, for there can be no doubt about its parentage and the authors show that the joining of agriculture and business into a single unit of thought is entirely legitimate. As a matter of fact, it is their contention that the business of supplying agriculture with its needs and the business of processing and distributing the agricultural products have only recently been separated from what we now call agriculture—the business of producing commodities. In 1800, they point out, farmers still produced their own machinery and raised and fed their own power units—they also processed and marketed the products. In those days, there could be no cost-price squeeze for the farmer bought practically nothing. Nor could there be the great productivity and the high standard of living that a division of labor has brought us.

The authors point out that we must consider the producers of farm machinery, fertilizer and petroleum products; the packers, canners and distributors of farm products as being in an economic partnership with the farmer. No one of these divisions of *agribusiness* can operate as separate units, ignoring the problems of the others. They are still as closely related to each other as they ever were. Yet, we *have* fallen into the error of thinking of them as separate entities.

In showing what this combination called agribusiness is, the authors shake us loose from a number of preconceptions. We think of the number of farms and the number of the farmers as shrinking and therefore might conclude that the importance of agriculture to our economy has also lessened. When thought of as *agribusiness,* however, we find that there are two workers off the farm producing farm supplies and processing and distributing food for each worker on the farm and that agribusiness accounted for 40 per cent of our consumer expenditures. Through a series of input and output charts which show the source and cost of supplies necessary to produce the product and the destination and price received for the product, the complete interdependence of the three major groups which make up

(*Continued on page* 128)



Carl Alpers, on the left, who has three M&W Piston equipped John Deere tractors on his 480 acres, didn't doubt for a minute that Maynard Schleeter knew what he was talking about.

"...but they changed their tune when I proved it by Dynamometer test!"

It *is* hard to believe that a 16-year old tractor with a smaller engine could possibly develop as much horsepower as a new and bigger Farmall. And Maynard Schleeter who farms 600 acres of deep dark dirt just north of Colfax, Illinois, took quite a bit of good natured kidding about it until he proved he was right by actual Hydra-Gauge Dynamometer test.

But let him tell you about it in his own words:

"Five years ago I put M&W Add-POW'R Pistons in my 1941 M tractor. They jumped the horsepower from 39 to 51, which was a good 10 more than it had when brand new.

"This spring, with more land to farm, I bought a new Farmall 450, and it's quite a tractor. But, about the same time, I had a set of M&W's new Turbo-Dome Pistons put in the old M. And here's where I had to take my friends in for a Dynamometer test to convince them that the old M was actually developing 3 more horsepower than my new tractor. And the new one has a much bigger engine.

"But that wasn't the end of it. While they were running the test, they put one of M&W's new air filters on the old M and it gave it a boost of another 2 horsepower!

"So, starting with a 16-year old tractor that developed about 40 horsepower when new, I've now got a real work-horse with more horsepower than my new one right off the production line."

And Mr. Schleeter adds that in stiff plowing this fall, his M plowed lick for lick with the 450 and did it on 4 to 5 gallons less fuel a day. The reason for this fuel economy is, of course, that his M has less piston displacement—a 4-inch bore compared to 4⅛-inches.

Increased piston size, alone, *isn't* the answer to increased horsepower, but M&W's exclusive Turbo-Dome design *is*. They squeeze every ounce of power from every drop of fuel like no other piston in new tractors or old.

M&W Turbo-Dome Pistons will increase the horsepower and operating efficiency of *your* tractor—*regardless of make or model*. See your M&W Tractor Products dealer for M&W Turbo-Dome Pistons specifically engineered for your tractor. Make a "before" and" after" Dynamometer test. You *can* have 1960 tractor performance from your tractor TODAY!

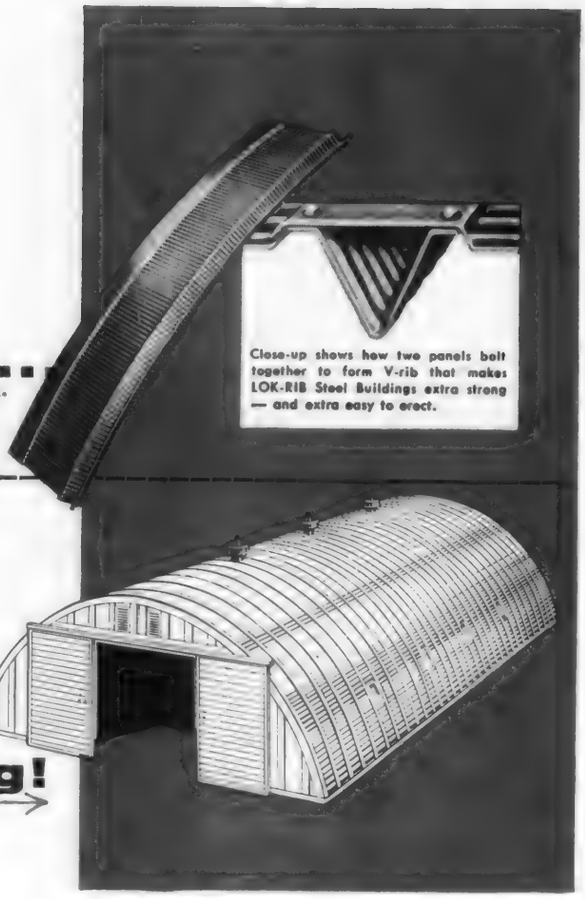
M&W TRACTOR PRODUCTS

BOX 3908 ANCHOR, ILLINOIS

World's largest manufacturer of the most complete line of tractor improvements products for the betterment of agriculture.

...O-DOME PISTONS • ADD-POW'R PISTON RINGS • LIVE POW'R PTO • LIVE HYDRAULIC SYSTEMS • ADD-POW'R "DRY-TYPE" AIR FILTER • 9-SPEED TRANSMISSIONS • 12-VOLT ...ON SYSTEMS • INSTANT RESPONSE GOVERNORS • HI-LIFT ROCKER ARMS • HYDRA-GAUGE DYNAMOMETER • SAFETY-LOCK THROTTLES • ROOT SAVERS • NO-CLOG WHEEL CLEANERS

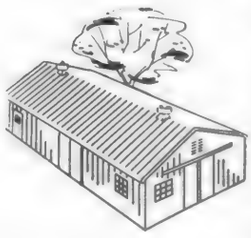
Buy these panels...



Close-up shows how two panels bolt together to form V-rib that makes LOK-RIB Steel Buildings extra strong — and extra easy to erect.

Build this building!

Goes up faster—lasts longer—costs less!



New! Inland Straight Sidewall Steel Buildings. Tapered rigid frame provides strength, economy, versatility. Available in varying widths and lengths. Send coupon for more details.

You can erect a LOK-RIB Steel Building in a hurry! There's no special framing to wrestle with —you simply bolt together the 18-gauge LOK-RIB Steel Panels.

Once it's up, you've got a building of amazing strength. If you were to build a frame structure just as strong, you'd have to support it with two-by-fours *every 3½ inches* along each side wall — and it would take a lot longer to erect!

Better yet, LOK-RIB is safe from fire — because steel can't burn! And you're protected also from damage by windstorms, snow, ice, rot and rats.

There's a LOK-RIB that's the right size to meet your needs. Free bulletins tell how you can get it now and take five whole years to pay. Mail the coupon.

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TEAR OUT COUPON AND MAIL TODAY!

INLAND STEEL PRODUCTS COMPANY LOK-RIB Steel Buildings
Dept. L, 4089 West Burnham Street, Milwaukee 1, Wisconsin
Send me free bulletins on:
☐ Lok-Rib Arch-Type Steel Buildings. ☐ Inland Straight Sidewall Steel Buildings.
I am thinking about:
☐ machinery shelter ☐ grain storage ☐ dairy barn
☐ cattle shelter ☐ hay storage ☐ poultry house ☐ other.....
☐ Have a LOK-RIB representative call on me.

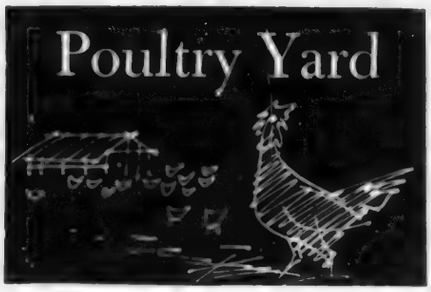
NAME.....

ADDRESS.....

COUNTY.....

CITY..... STATE.....

I am an ☐ owner ☐ tenant ☐ student LR-14



Bird in a Cage Caging a bird changes the egg she lays, University of Missouri poultry scientists found in a recent study. Comparing the eggs laid by caged birds with those laid by their sisters on the floor, they found that the caged birds laid larger eggs with thicker albumen than the floor birds. Their eggs, however, had more blood and meat spots than the eggs laid by the floor hens. Both floor and caged birds laid more blood and meat spot eggs in March than in any other month. During the summer, warm temperature reduced the egg shell thickness of both birds—shell thickness, incidentally, was found to be about the same for each group.

Babies Without Daddies In the Summer issue in 1956, we talked about the strange case of the poults that were born from eggs laid by virgin hens that had never seen a tom turkey. Reproduction without a union of sperm and egg, parthenogenesis, has been a continuing study at the Department of Agriculture experiment station at Beltsville since 1952. To date they have hatched several poults which have lived from a few minutes to 18 days, 22 days, 41 days, and now one which had passed the 156-day mark when we went to press. All have been males. They have also found lines of Dark Cornish chickens which have a tendency toward parthenogenesis. Though none of these have produced living chicks there have been a number which have produced eggs showing a beginning of cell growth under incubation and at least two which developed embryos.

The latest report from Dr. M. W. Olsen, who is running the experiments, is that eggs from birds—both chickens and turkeys—which have been vaccinated for fowl pox show much more tendency toward parthenogenic development than eggs from birds of the same strain which have not been vaccinated. In turkeys, the score was 24 per cent parthenogenic for the unvaccinated and 32 per cent for the vaccinated. Birds vaccinated for pigeon pox—a milder virus—also showed an increase in parthenogenic eggs. Not only were more eggs parthenogenic, but the extent of the embryo development was also greater in the eggs from vaccinated birds. Dr. Olsen is not sure whether the parthenogenesis is increased by the virus in the vaccine or by some impurity it may contain.

HERE'S THE HEART OF QUALITY HAYMAKING !

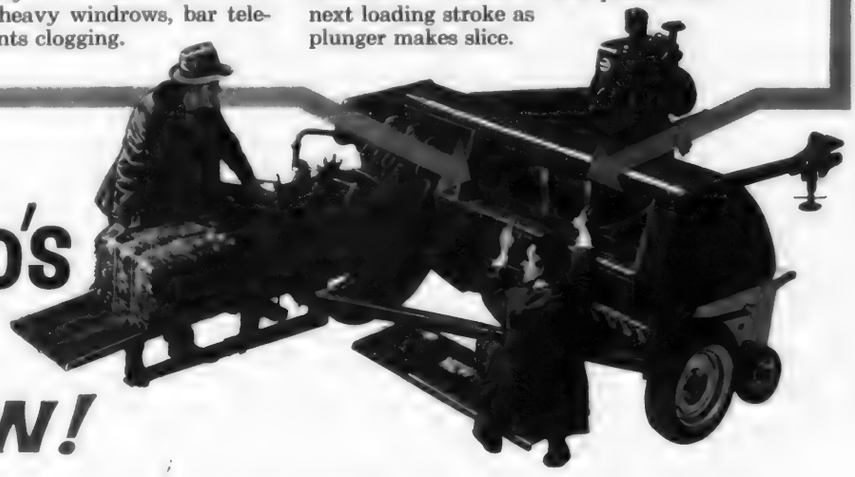
Here's how Flow-Action works

(1) **Start of stroke:** Spring-loaded aluminum feeder tines mounted on sturdy telescoping bar engage the hay.

(2) **Loading:** Tines measure off right amount of hay . . . move it toward chamber. In heavy windrows, bar telescopes, prevents clogging.

(3) **Distributing:** Tines lift upward, distribute hay evenly throughout bale chamber . . . to make firm, square bales.

(4) **Return stroke:** Tines lift clear of chamber . . . retract to first position for next loading stroke as plunger makes slice.



NEW HOLLAND'S *EXCLUSIVE* *FLOW-ACTION!*

The greatest baling advance in 17 years! Smooth-acting aluminum tines move hay gently from pick-up to bale chamber . . . measure each charge of hay accurately . . . prevent overloading or jamming

It's new! It's different! It's exclusive on the New Holland Hayliner!

Gentle feeder-tine action saves protein-rich leaves . . . helps assure even density . . . avoids clogging. Your hay has no sharp corners to turn. No auger. No wadboard. Just a smooth, easy flowing action! With New Holland's exclusive Flow-Action, you get the greenest, richest bales you've ever made . . . firm, square, *quality* bales that cure quickly and evenly.

You get economical performance, too. Flow-Action is simple in design . . . has fewer moving parts to wear and need adjustment. It runs easier: requires less power. That all spells easier maintenance and cheaper operation.

See amazing Flow-Action *in action* in the great Hayliner. Stop in at your New Holland dealer's *today!* New Holland Machine Company Division of Sperry Rand Corporation, New Holland, Pennsylvania.

NEW HOLLAND

"First in Grassland Farming"

DEKALB PRODUCTS

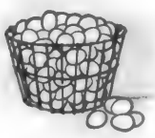
can MAKE you MORE MONEY

EXTRA BUSHELS

Correct adaptability, high shelling percentage, corn that clings to the stalk until picked, big yields . . . bred right in . . . All of these DEKALB CORN FEATURES add up to EXTRA BUSHELS that can, indeed, MAKE YOU MORE MONEY. DEKALB . . . the top selling seed corn for 18 straight years.

EXTRA GRAIN

If you've had an opportunity to view a big, open, grain-heavy head of DEKALB HYBRID SORGHUM, you can well-imagine how much EXTRA GRAIN can be harvested from a DEKALB FIELD. And, like seed corn, more farmers plant DEKALB than any other hybrid sorghum in America.



EXTRA EGGS

All over America DEKALB LAYERS are showing poultrymen that it's high, steady production, year after year, that really counts. DEKALB's fine, white-egg-laying pen won the 3-year-average, seventh California Random Sample Egg Laying Test . . . averaging 254 eggs per pullet, (based on the number of pullets at one week of age). Income over feed cost for this period was $4.71 per hen.

The name DEKALB has become synonymous with QUALITY during its many years of service to America's Farmers. And behind this is a long record of customer satisfaction . . . a record based on full value and performance of product. Let the DEKALB trade-mark be a sign of Good Farming and Good Return to you.

DEKALB AGRICULTURAL ASS'N., INC., DEKALB, ILL.

Commercial Producers & Distributors of DeKalb Seed Corn, DeKalb Chix & DeKalb Hybrid Sorghum

"This one really talks the farmer's language!"

"A farmer like me, anyhow. Working big acres, there are three things you want from a tractor. *Power*, and plenty of it. *Comfort*, too; you're pretty much living on that tractor once things get rolling. Now throw in *economy*, and what tractor do you take? For me, it has to be this Oliver Super 99, with the GM diesel. Here's all the power you could want —77 horsepower, drawbar. A roomy platform...a comfortable seat... steering like a small tractor. And with diesel, my fuel bills are down almost two-thirds. Yes, I'm convinced: Oliver gives me the power to produce at the lowest possible cost."

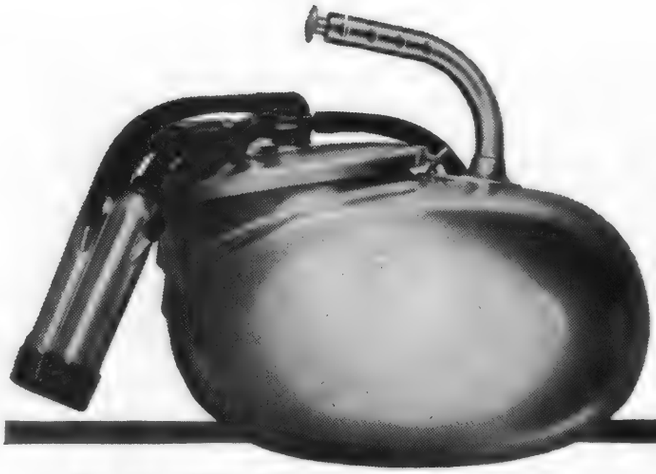
Buy your new tractor
on the
"Pay as you Produce"
purchase plan
Ask your OLIVER Dealer

YOUR OLIVER DEALER ADDS: "Remember, a big tractor doesn't have to mean a big initial outlay. Oliver talks your language on *payments*, too: just ask me to explain our 'Pay as You Produce' purchase plan."

The Oliver Corporation, 400 West Madison St., Chicago 6, Illinois

OLIVER **OLIVER**

"FINEST IN FARM MACHINERY"



NEW DE LAVAL SUSPENDED MILKER

Here is the perfected suspended milker... a truly modern suspended...with revolutionary features that assure faster, cleaner milking...and absolute cow comfort!

NOW!...

no matter what type milker you prefer...

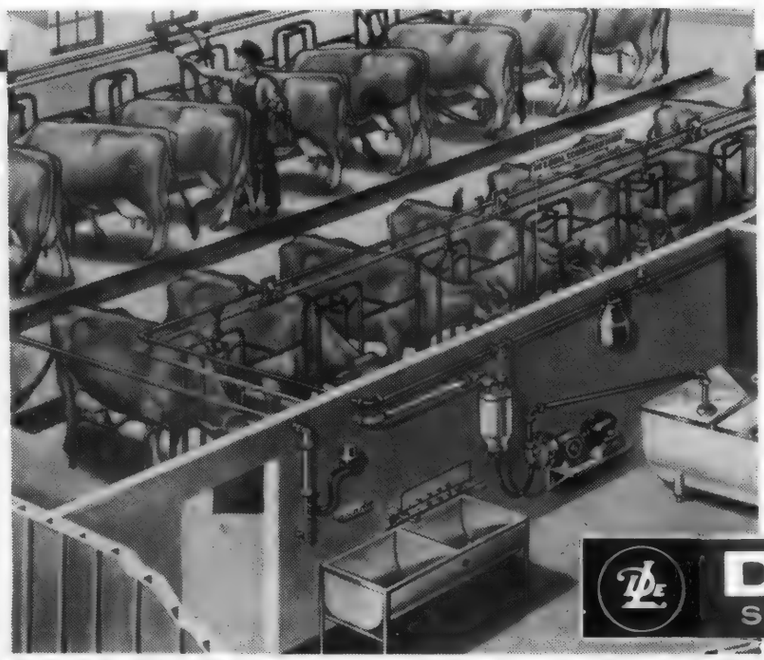
NEW DE LAVAL PAIL TYPE MILKER

Years ahead—no operating parts on cover...easier than ever to handle...new sanitary features...cuts time and work ...means cleaner, faster milking.

DE LAVAL HAS IT!

DE LAVAL COW-TO-CAN MILKER

Milk into your own cans...no pail carrying or pail wash up. No matter how few cows you milk... you can't afford to be without De Laval!



DE LAVAL COMBINE® MILKER

"Tailor-made" to meet your requirements exactly...gives you cleanest, fastest milking ...designed and proved trouble-free...insure peak profits...top efficiency...lowest production cost!

DE LAVAL SEPARATOR COMPANY

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

It Pays to Do Your Own Soil Testing

by H. J. Atkinson, director Sudbury Laboratory

Too many farmers do not yet realize there is an easy way to make up to twice the profit on the farm they now own without adding one extra acre! You can cut the acreage you plant to conform to soil bank requirements or for other purposes, yet wind up the year with a higher net income than any season in ten years.

That's how the family farm can continue to be the backbone of agriculture — both now and in coming years when increased population will require every bushel you can raise from every acre you own.

So much has been learned about the soil and its care by research scientists, professors, agronomists and extension workers in agricultural colleges and experiment stations that they have revolutionized the business of farming. They have made it possible to double the average yield per acre.

All that is needed is to be open-minded enough to take advantage of their discoveries, and get far more from your farm than 100% of parity would bring you on the crops you now produce.

It takes almost all you get for the first 40 bushels of corn per acre just to pay your costs—then your profits begin to climb! Raising average yield up to 70 bushels by using the proper kinds and amounts of fertilizer, impossible without soil testing, will boost profits from $11.80 to $42.00 per acre (if sold at $1.40 per bu.). What applies to corn is true with other farm crops.

Get Results Quickly

Hundreds of thousands test their own soil with the Sudbury Soil Test Kit. Some use their kit in addition to state laboratory tests where they can get them; others rely on it completely and do a more thorough job than to send a few samples off by mail.

The demand for soil testing has grown so fast some laboratories must take several weeks before reports can be supplied. One of the country's leading soil authorities has said the soil testing that should be done in this generation cannot be done unless more farmers do their own.

No one can afford unnecessary losses when a Sudbury Soil Test Kit costs only $29.95. It tells what is wrong even before you plant, and how to correct it. All summer long it keeps watch to let you know if more fertilizer is needed; next fall it tells how much this year's crops used up, and how much you need for next year.

If you don't test your soil now, it may cost hundreds of dollars this year.

Make More Money

How to Make Your Farm Pay You More in 1958

These are days when every dollar counts! You can't afford to buy fertilizer and not be sure it's what your crops need. You can't afford to do without it either! Don't gamble—make sure every dollar you spend pays back up to $10 or more in extra yield. ***That's your sure way to make more money this year!***

Besides getting bigger crops with a Sudbury Soil Test Kit, you'll save money on fertilizer—up to $15 an acre.

Do It Yourself with this

Farmers Lifetime Soil Test Kit

Complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amounts of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. County agents, ag colleges, vo-ag schools and progressive farmers everywhere depend on it. Lifetime welded steel chest with carrying handle. Easy instructions show needs of 225 different crops.

Don't wait for poor crops to show your soil is sick. Your Soil Test Kit tells what is wrong even before you plant, and how to correct it.

If you've already bought your 1958 fertilizer, a Soil Test Kit shows how best to apply it. If you haven't ordered, it tells you what you need.

Big Value, only $29.95.

You can take your kit right out in in the field and test as you go. No one else knows your farm as well as you—you know the poor spots in every field. That's where you'll want to test first, then the good acres alongside. You'll be amazed how different their needs are.

Experts now agree that soil testing and proper fertilizing is more important than adding extra acreage. Regardless of what crops you're growing, it's the yield per acre that counts . . . not the number of acres you work!

Every Acre You Plant Can Give Extra Yield

Sudbury users all over the country report increases in both yield and quality—like the Ohio farmer who doubled his wheat crop, tripled corn and hay, boosted oats 500%. Wouldn't you like to grow up to 200 bu. corn per acre—or 700 bu. potatoes, 60 bu. wheat, 100 bu. oats, 5 tons hay, 30 tons tomatoes, 300% increase in milk?

You not only make money, you save money. An Illinois farmer "guessed" he needed 235 tons of limestone, but tests showed he did not and saved him $500 which paid for phosphate really needed on 65 acres. That wrong guess would have cost him more than a dozen Soil Test Kits!

Get every dollar's worth of value out of the fertilizer you buy this winter, as well as next spring and summer. You'll use your kit all season long.

No Knowledge of Chemistry Needed

Easy as Reading a Thermometer

So simple anyone can use it. Even your first tests will be accurate and reliable. Ready to use anytime, anywhere, even out in the field. Takes only 10 minutes, costs less than 10c a test. No delays waiting for reports ***—you get the correct answer right away.***

Soil Can Make, or Break You!

Sudbury Soil Test Kits make poor farms rich, even biggest farms more profitable. Soil testing is the best insurance against drought losses. Use of soil test kits is approved by U.S. Dept. of Agriculture.

In just 2 weeks your Soil Test Kit will pay for itself many times over!

The right fertilizer prevents stunted ears, weak roots and lodged stalks. Corn ear and stalk at right were grown in tested soil, fertilized correctly.

FREE TRIAL and also Better Crops GUARANTEE

You Take No Risk—use it for 10 days free trial; if not delighted return for refund. Sudbury's daring **Better Crops Guarantee** says we are so certain you'll get bigger crops we'll refund the full price of your kit next fall if you don't.

Over 500,000 Now In Use

SUDBURY Soil Test Kits

Sudbury is the World's Largest Maker of Soil Test Kits

SUDBURY LABORATORY
Box 21J, Sudbury, Mass.

FREE BOOK If you send cash we'll also include the valuable 64-page book on farm management, "Our Land and Its Care."

CUT OUT AND MAIL TODAY!

3 ways to pay

FREE TRIAL Order Blank

SUDBURY LABORATORY Box 21J, Sudbury, Mass.

Send me the Sudbury Lifetime Soil Test Kit for free trial on your Money-Back Offer and Better Crops Guarantee. I am using the payment plan checked below:

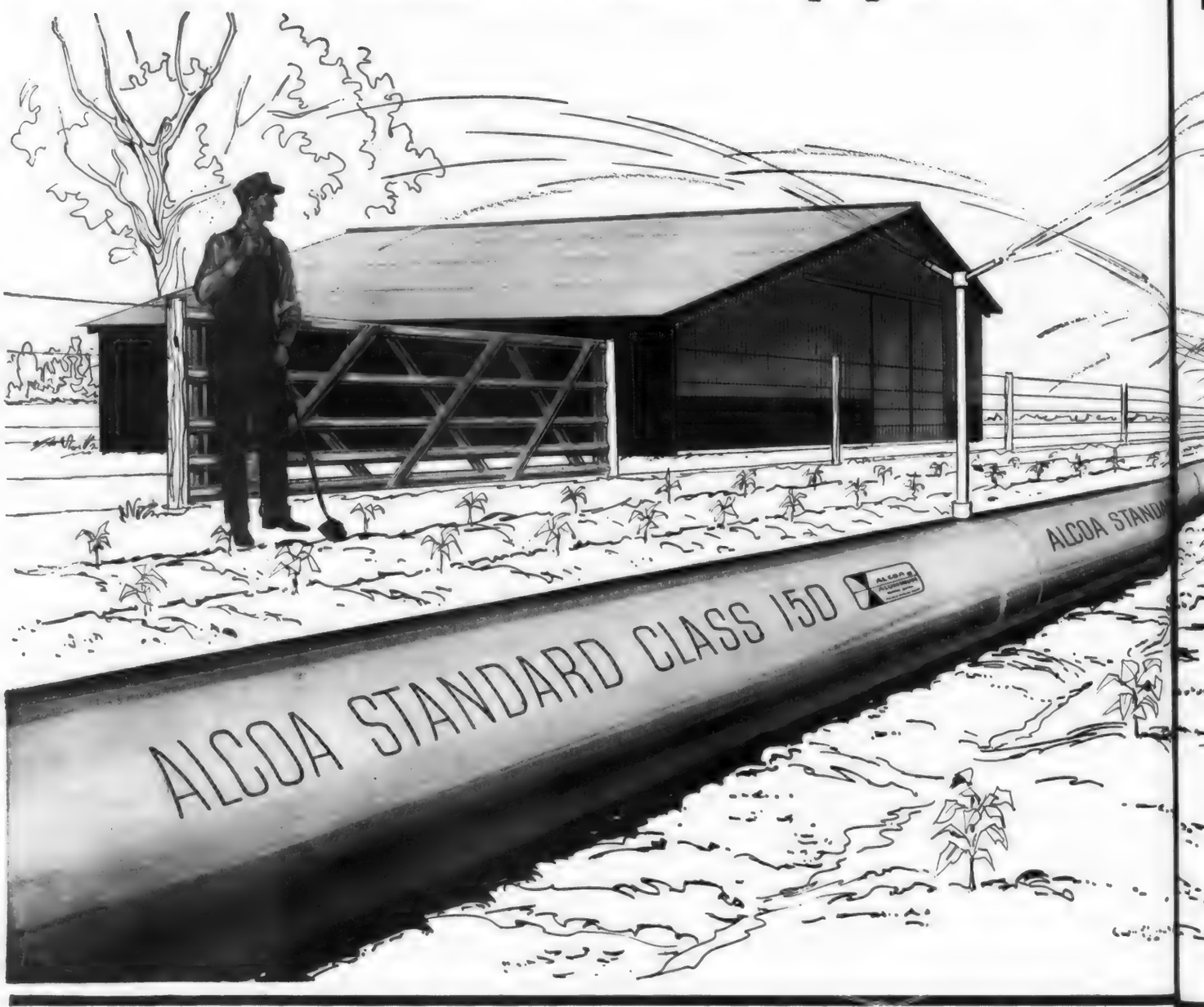
- ☐ Enclosed is check or money order for $29.95. It is understood you will send prepaid, saving me $1.91 to $3.55 in delivery charges. **I am also to receive FREE the valuable book on farm management, "Our Land and Its Care."**
- ☐ Send my Soil Test Kit C.O.D. I'll pay $29.95 and delivery charges on arrival.
- ☐ **Easy-Payment Plan.** I'll pay mailman $4.95 plus delivery charges, then send you 4 monthly payments of $6.75 each.

Name.....

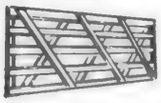
R.D. or St......

P.O......*Zone*.....*State*.....

Alcoa Aluminum... pipeline to



ALCOA FARM GATES



Maintenance and repair chores, besides making demands on time that could better be devoted to productive work, are often costly. The *no-upkeep* Alcoa Farm Gate, once installed, ends gate repairs and replacement. It can't rust or corrode —never needs painting. It's extra strong, can't twist or sag because it's braced and riveted like a bridge. Available for 10 to 16-foot openings, 52-inches high, 5 or 6 panels. Also 36-inch-high hog gate.

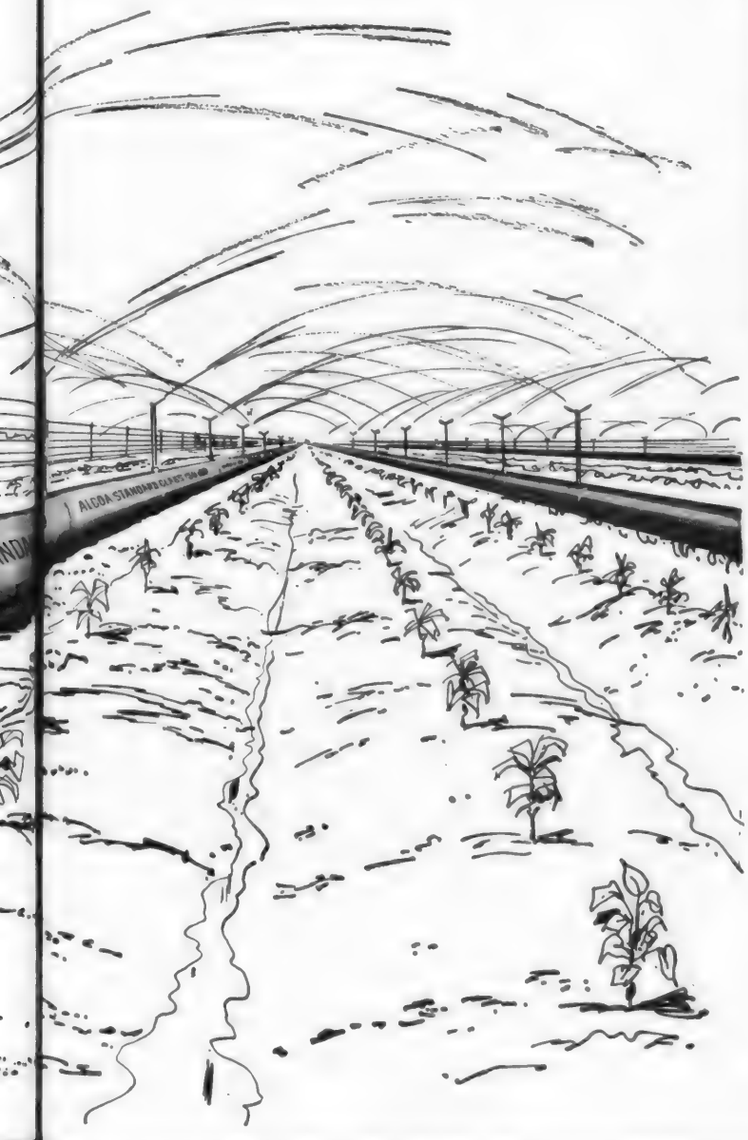
ALCOA WRAP

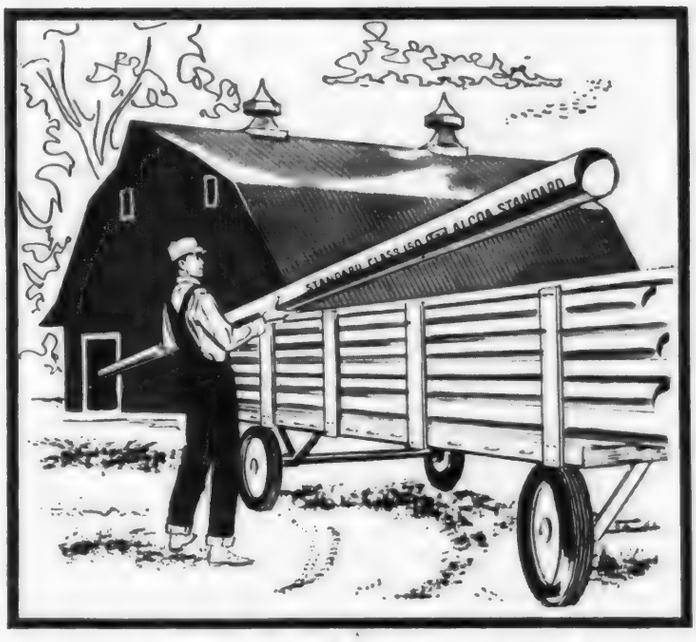
Strong Alcoa Wrap is the aluminum foil of almost unlimited versatility. It's easy to use, helps speed up many kitchen chores with less fuss, less mess. Foods sealed and cooked in Alcoa Wrap hold their full flavor, stay appetizingly moist and tender. Use it for wrapping sandwiches, saving leftovers, food freezing, gift wrapping. Always keep Alcoa Wrap on hand—it's mighty handy. Available at grocery stores everywhere.

ALCOA NAILS AND FASTENERS

Countersink, putty, paint and then repaint. Tnat's the costly cycle you eliminate with nails, screws or bolts of Alcoa Aluminum. These rust-free nails and fasteners can never leave ugly stains. Nail pox is eliminated. Alcoa Nails are tempered for strength, etched for holding power. Alcoa Nails and Fasteners are available in all types and sizes at farm supply and hardware dealers.

profitable farming





ALCOA IRRIGATION PIPE

Plan *now* to increase your crop and pasture yield next year. Alcoa® Aluminum Irrigation Pipe can help you get maximum per-acre harvests—double present yields and even more. Alcoa Irrigation Pipe is built for high-pressure pumping over long hauls, precision-made for efficient service. It's light, durable and corrosion-resistant. Your local dealer can provide expert planning and installation service. For more information, send the coupon.

Your Guide to the Best in Aluminum Value

ALCOA
ALUMINUM
FARM PRODUCTS
ALUMINUM COMPANY OF AMERICA

***NEW!* "ALCOA THEATRE"**
Exciting Adventure, Alternate Monday Evenings

ALCOA ROOFING AND SIDING

Buildings of Alcoa Roofing and Siding, in addition to being maintenance-free, actually help keep livestock or poultry more comfortable, more productive. Alcoa Aluminum Roofing reflects summer heat; interiors stay as much as 15 degrees cooler. In the winter months, heat stays inside. Yet these buildings of Alcoa Aluminum can be built with savings of up to 75 per cent in material and labor costs compared to conventional building construction. Here's proof—Alcoa Aluminum is part of profitable farming. Get all the facts—send for Alcoa's Pole Building Plans Catalog.

Aluminum Company of America
2071-M Alcoa Building
Pittsburgh 19, Pennsylvania

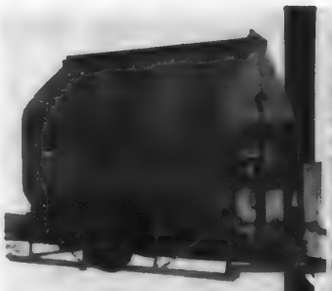
Please send the following free information:

☐ *Pipelines to Profit,* irrigation booklet; ☐ Alcoa Farm Gate literature; ☐ *Alcoa Pole Building Plans Catalog;* ☐ Alcoa Nails and Fasteners literature.

Name_____ ☐ Farmer

Address_____ ☐ Dealer

Post Office and State_____ ☐ Student



Behlen Grain Dryer —
Famous fast drying rate and "Easy-Does-It" features have made Behlen America's top-selling Grain Dryer. Exclusive Curved-Hexagon design eliminates corners, keeps all grain at uniform distance from air-source for maximum, clear-through drying. Grain leveler (to distribute grain evenly when filling bin), catwalk and galvanized ladder are standard equipment. Models for propane, natural gas and fuel oil in 250, 375 and 500-bu. capacities.

NEW 1957 Behlen All-Steel Bar Mesh Corn Crib —
All-galvanized Behlen Crib featuring new steep-pitch roof design saves your time, permits quick, full-capacity crib filling. Eliminates hand leveling. New roof also has an easy entrance section and extra-large peak opening. Steep roof angle lets elevator lay against roof with spout directly in opening — eliminating need for extra chute and time-taking adjustment. Available in 611-bu. to 2,367-bu. capacities.

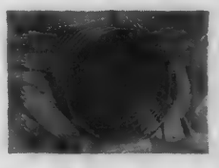
Behlen

gives you 12 months of perfect crop weather . . . every year!

You can make your own perfect crop weather . . . and actually make more money on your crops with Behlen! No need to depend on the weather to *dry* your crops before harvest. No need to take a chance on storing high-moisture-content crops—and losing money to rot and spoilage. No need to suffer crop loss because of improper storage facilities. Read how these Behlen products give you *safer, more profitable CROP STORAGE AND CONDITIONING!*

Behlen Grain Storage Bins —
Extra-deep corrugations in heavy gauge galvanized steel assure greatest strength and rigidity. Withstands the weight of stored grain without the need for cross ties, etc., in the doorway. Exclusive Double-Seal Door gives double protection — keeps grain in, keeps weather out! Available in six sizes — 1,000-bu. to 3,200-bu.

Behlen Frameless Metal Buildings —
Behlen Buildings are custom-built at standard prices — completely prefabricated to meet your specifications. Sturdy, self-framing construction of heavy gauge, channel-ridged metal permits eave-to-eave grain storage, without double walls. Pick your own grain storage capacity, one thousand to one million bushels.



WRITE TODAY for FREE Literature or SEE your nearby Behlen Dealer!

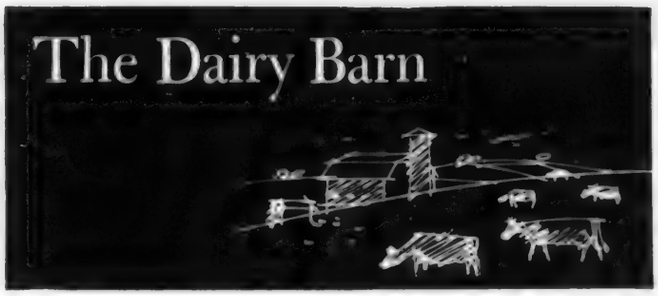
Behlen All-Steel Tunnels & Ventilators
Extra heavy gauge steel bar mesh — "Post-Fab" galvanized. Tunnels are 20" wide, 17" high. Ventilators, available in 4-ft. sections, 10" diameter.

Behlen Mfg. Co., Dept. F-12, Columbus, Nebr.
Send me, without obligation, complete information on:
☐ Grain Dryer ☐ Grain Storage Bin
☐ Frameless Metal Building ☐ 1957 Corn Crib
☐ Moisture Tester ☐ Ventilators & Tunnels

NAME:_____

ADDRESS:_____

CITY:_____ STATE:_____

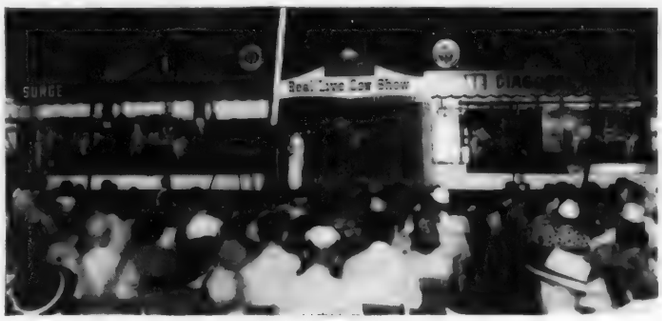


Cows on the Show Circuit

A good circus is one of those things you can't hardly find anymore. But a few years back when a circus was a circus with lions 'n tigers 'n everything making one-night stands around the country, one of the things that used to amaze farmers—or any one else, for that matter, who had ever worked with livestock—was how they could keep all those animals on feed and in such good shape.

This past summer we happened to run across the Surge Real Live Cow Show which has been making the rounds of the state fairs demonstrating milkers made by you-know-who. Well, we got curious about how the heck you can keep a bunch of cows not only in good shape, but actually producing a decent flow of milk as well, all the while they are traipsing from one fairground to another and performing like trained seals in front of noisy crowds. So we asked Bob Hohmann, one of Babson Bros.' regional managers who has worked with the show for several years, to give us the behind-the-scenes information. Here is what he had to say:

"This year, which was typical, the Real Live Cow Show pulled



An acting cow must love her art to put up with the heavy travel schedule.

out from its assembly point at Belvidere, Illinois, for the first state fair at Springfield on August 5. The cattle had been purchased by a livestock dealer and delivered to the farm only about three weeks prior to that. We had 20 grade Holsteins—we use only one breed because of the complications involved in shipping long distances with different size cows in the truck—and the only instructions we gave the cow jockey who bought them was that he deliver to us cows that were very recently fresh, that were accompanied by a clean bill of health from the state veterinarian and whose udders were sound. We don't accept 2-year-olds as we feel they are rather dangerous on the Cow Show. We don't know whether she is an easy or a hard milker.

"When the truck backs up to the farm at Belvidere, the cows are haltered as they are unloaded and led into an old feed manger in a steer barn where they are tied in a tie-stall-like arrangement until the show leaves for the first fair.

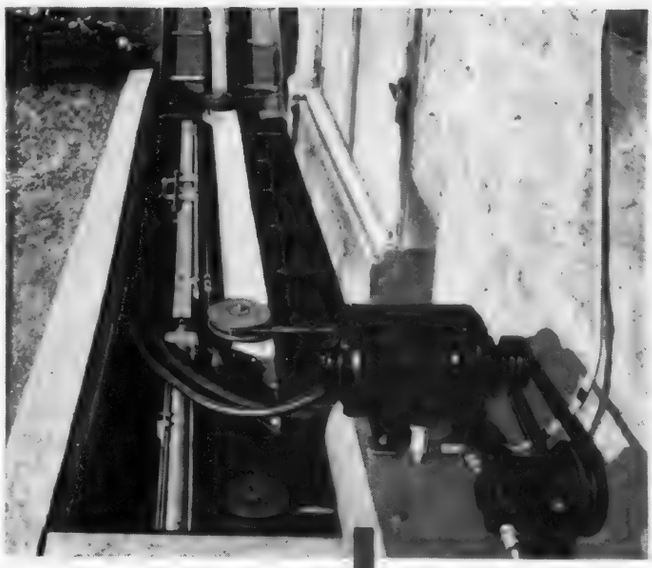
"They are led out two or three times daily to a water tank some distance from the barn, since the association they have with going to water makes the job of breaking to lead much simpler.

"They are immediately put on a ration of the best hay available plus dry and freshening feed and plain beet pulp. They are milked night and morning with a Surge bucket milker and within four or five days are put through the milking parlor on the stage that will be used on the road.

"The biggest complications we have while on the circuit are

(*Continued on page* 126)

New Power Choring from Jamesway



NEW

PISTON-POWERED HYDRAULIC BARN CLEANER

most powerful, economical, strongest, safest barn cleaner ever built

- Big, husky ram with an 8-foot stroke furnishes 2-way power to gutter shuttle-cleaners. Flexible. Safe. Economical.
- Big-capacity, motor-driven hydraulic pump handles over 100 cows in stalls. Plenty of power for bonus capacity with this new hydraulic barn cleaner.
- Shown above, a typical installation. Flexible Jamesway hydraulics let you install the motor, pump, tank and ram inside or outside, lengthwise or crosswise in your barn.
- See your Jamesway dealer for details now. Or write JAMES MFG. CO., c/o your nearest division office. Fort Atkinson, Wis.; Lancaster, Pa.; Los Angeles 63, Calif. Address Dept. FQ-127.

Now Jamesway engineers have taken the genius of Shuttle-Stroke design . . . combined it with the economy and flexibility of hydraulics to give you a brand new barn cleaner that power-cleans gutters *slick as a whistle.*

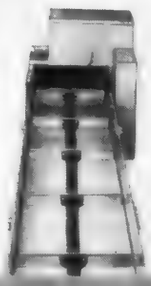
Famous push-pull action mixes liquids and solids, speeds them to the Liqui-Matic or Flat Bed elevator. High speed elevators can't possibly overload. Won't freeze up either — both models are self cleaning.

Unmatched simplicity and economy are yours with Jamesway's rugged, efficient design. The whole power unit consists of one motor . . . one pump . . . one oil tank . . . one self-reversing ram. It's the strongest ever . . . no gears, no pins, no sprockets to break. No worry about overloading — a safety release valve bypasses oil when pressure reaches 900 lbs. And all drive parts operate in oil for lowest possible wear.

See this revolutionary Piston-Powered Cleaner at your Jamesway dealer's now. You'll agree, no other barn cleaner can touch it for power, strength, safety and lowest possible cost.

JAMESWAY POWER CHORING MECHANIZES YOUR BARNYARD AS YOUR TRACTOR MECHANIZES YOUR FIELD WORK

New Shuttle-Stroke cleaner is smooth in action . . . cheaper to install. Outworks, outwears all others. Does 2 or 3 hours of hand labor while you do other chores. Here's power choring at its best.



Choice of two new all-steel elevators—Liqui-Matic and Flat Bed. Liqui-Matic runs at 8 times and Flat Bed at 4 times the speed of gutter shuttles. Both save the liquids as well as the solids — save the most valuable part of the manure.

$1.00 a day takes backaches away

For a small down payment and $1 a day, you can own any piece of Jamesway Power Choring equipment. Takes the place of $1 an hour hired man.

Jamesway

FIRST IN POWER CHORING

FOR POULTRY • FOR DAIRY • FOR LIVESTOCK

Just Arrived! ALL-NEW '58 DODGE *PowerGiants*

4-WAY LEADERS OF THE LOW-PRICED 3!

Today, for the first time in farm truck history, one make leads the low-priced three *all four ways* —in styling, power, load capacities and economy. And these are the trucks—all-new Dodge *Power Giants* for '58!

See them now. Check their smart prestige styling, finer engineering. And check your Dodge dealer's special 40th-anniversary deal. Get *more* for your money with the 4-way leader of the low-priced 3!

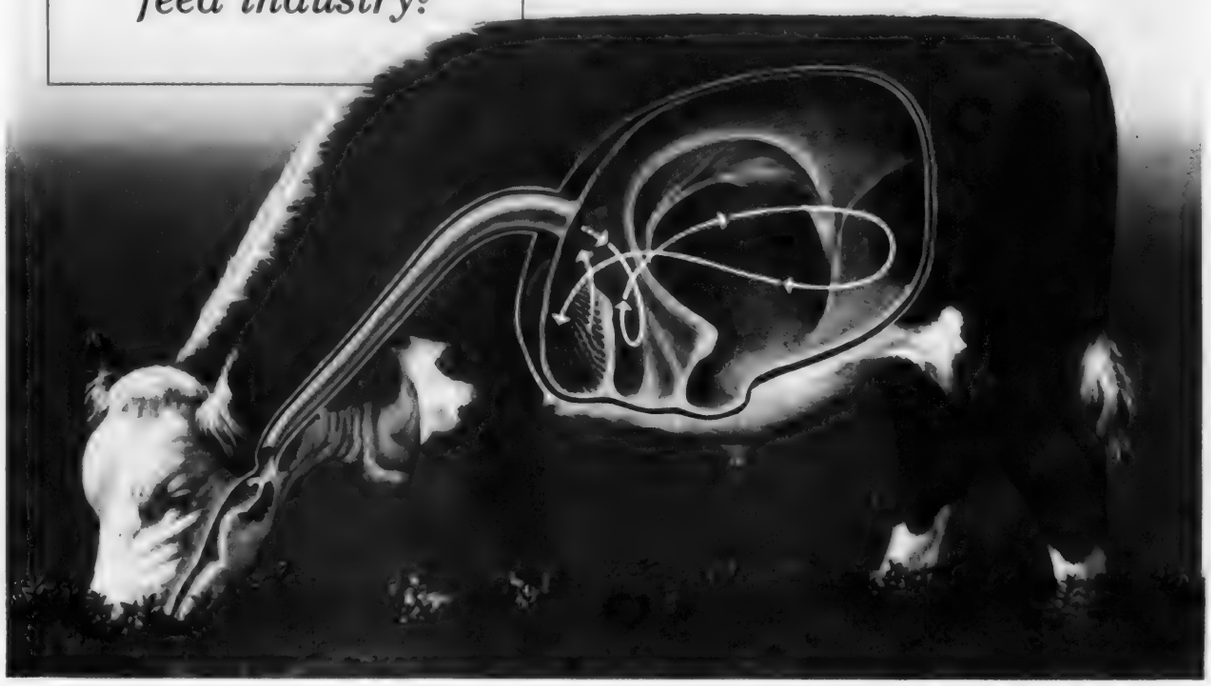
1 FIRST IN STYLING
Sleek, trim . . . yet massive. All-new design . . . from gleaming chrome-crowned grilles and modern dual headlights to new luxury cabs.

2 FIRST IN POWER
Most advanced of all V-8 truck engines . . . 204 to 234 hp. Extra power makes passing safer, reduces engine strain. Thrifty 6's also available.

3 FIRST IN PAYLOAD
Advanced Chrysler Corporation engineering gives added ruggedness *without* added weight. Result: you can haul up to 1/3 more per trip.

4 FIRST IN ECONOMY
Exclusive Power-Dome engine design gives more miles per gallon—on *regular* gas. Also ends power-robbing carbon deposits, cuts upkeep cost.

What next
from Pfizer and the feed industry?



FEEDS THAT FIGHT BLOAT

. . . NEW RELIEF FOR A 40-MILLION-DOLLAR PROBLEM

Bloat costs U. S. beef, dairy, and sheep producers over 40 million dollars a year! While animals most frequently bloat on fresh legumes, this troublesome disease also strikes hard in the feedlot during the heavy grain-diet finishing period.

Three years ago the feed industry, in cooperation with other livestock research bodies, started an all-out drive to see if this disease—a killer of livestock since Biblical times—could be controlled or stopped.

Biochemical, physiological, bacteriological and pathological studies of the causes of pasture and feedlot bloat were started. Other studies were made to observe what happens to the lungs, heart, large blood vessels, and other vital organs when the paunch keeps pushing against them as bloat gas pressure builds up.

At the same time, feeding trials were started at two Midwestern university research stations and at the Pfizer Agricultural Research and Development Center.

Results of these three-year trials show that the antibiotic Terramycin mixed in feed reduced the incidence of feedlot and pasture bloat an average of 76%! In the few cases where bloat struck, Terramycin reduced its severity.

Feeds with this anti-bloat power will be available from many feed manufacturers in time for the 1957-58 feeding season.

What next from Pfizer and your feed man? Will the next important advance come with discovery of a new feed ingredient or will it be a result of more data on the relationships between the many nutrients we now have? It's hard to say . . . but, whatever it is, wherever it comes from, it will help you produce more meat, milk, and eggs faster and at less cost.

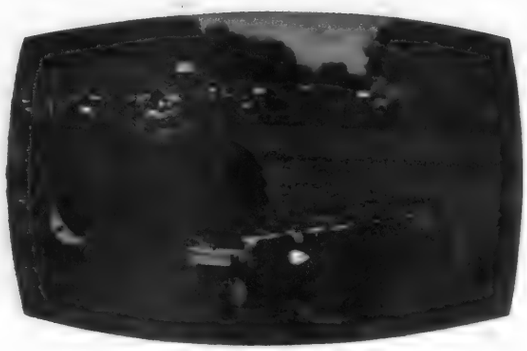
Science Comes to the Farm in a Feed Bag

Pfizer

Pfizer Agricultural Research and Development Department

when you condition your hay with a Cunningham

you feed field fresh June Pastures all winter long



Cunningham

HAY CONDITIONER

Protein is the heart of your hay
Save it in the summer and you can stop buying it in the winter!

You can see the difference in the field . . . pick up a handful of Cunningham conditioned hay . . . notice how the crimped stems are losing moisture immediately, curing as rapidly as the undamaged, uncrushed protein packed leaves. The Cunningham, with exclusive swath level "sweeping action," conditions your hay by crimping . . . not by crushing or squeezing. No more "rain gamble" . . . this hay is barn-ready 50% to 80% faster than unconditioned hay.

You can see the difference when you feed Cunningham conditioned hay in mid-winter. It's sweet smelling, palatable, natural rich green in color and . . . protein packed, top value leaves are in your manger . . . not left in the field, buried under winter's snow. You grow good hay in the fields . . . now you can save . . . and feed . . . up to 90% of this natural supply of protein-carotene. It's complete feed, without supplements . . . as nature intended. Your cattle know it . . . and show it . . . as they eat more, waste less of this full value hay.

See your dealer now . . . condition with a Cunningham next summer and you'll be feeding full protein June Pastures next winter.

MAIL COUPON TODAY!

Please rush me the free, full color "JUNE PASTURES IN JANUARY" story . . . the complete information on feeding full protein hay all winter.

NAME_____

ST. OR R. R._____

TOWN_____ STATE_____

RAY CUNNINGHAM & SONS, INC.
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Why should you buy a Cunningham? Because it's the World's Number One Hay Conditioner with more years of proven performance, in more areas, for more profit-minded farmers than all the other makes combined. When you buy a Conditioner — be sure you get a Conditioner — get crimping action — get a Cunningham!

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It's Christmas Tree Time Again

Markets report a surplus of trees---but not good ones. Growers are finding that shaping and selection to meet the new government grades are paying off to the tune of 300 dollars an acre

By Chester Charles

CHRISTMAS TREE TIME is here. In homes where children live, Christmas isn't Christmas without an evergreen tree, with its clean, woodsy aroma. Decked in family tinsel and tradition, it is a symbol of our most beloved season.

The tradition has become big business. Retail sales of Christmas trees topped 47 million dollars last year. A great part of the growers' share went to farmers in Pennsylvania, a leading Christmas tree state. Of the estimated 100,000 acres devoted solely to Christmas trees, 40,000 acres are in Pennsylvania. There are 3,000 Christmas tree farmers in 51 out of that state's 67 counties, with most of them in Indiana County, the Christmas tree center of the nation.

Farmers in neighboring counties have felt the influence, too. Ed Bonzo of Rochester, Pennsylvania, made his first plantings 20 years ago. He has 30 hilly acres on his farm and he wanted to tie down the soil. He was also looking forward to his later years and a small income from his tree crop. His first planting was 3,000 spruce and pine. Seven years later he took off his first harvest of Christmas trees. When the Pennsylvania Turnpike cut his farm to 100 acres, the value of his trees as a cash crop was important. He has never advertised; he started a roadside stand and his customers have been coming back every year to select their trees.

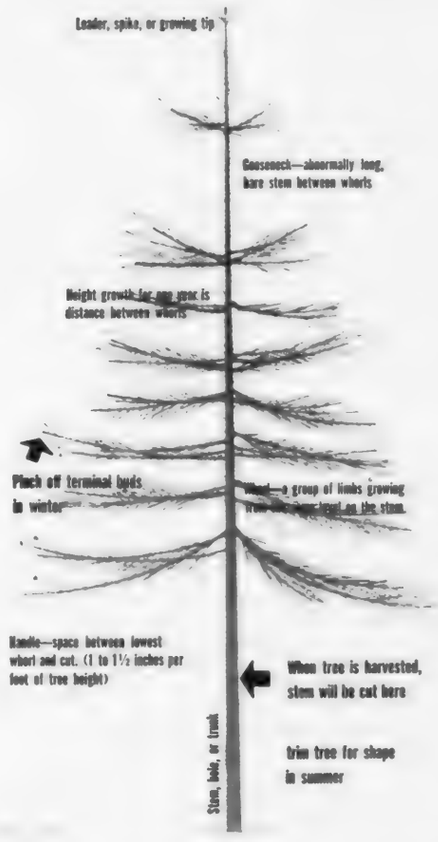
"You don't just sit back and watch 'em grow while you wait for the money to roll in," says Bonzo. "That's a big error. Christmas trees are like any crop. More attention means more return. To most people, the big surprise is the necessary shearing. It has to be done at least once a year to every tree.

"It's work, but trees pay a nice profit. My son got in the tree game some years back and sold his first crop last year. He cleared $350 an acre by working in his spare time. He works in town and sells some of the trees to men at his shop. He'd cut trees by the headlights of his car at night to take in fresh the next day. Part of his profits came from evergreen boughs—just trimmings of the shaping operation and branches from poor, unsalable trees. Christmas greens sell fast. My son would take a station-wagon load into town every day before Christmas last December. He got $10 a load for them from decorators for Christmas parties and store-window displays.

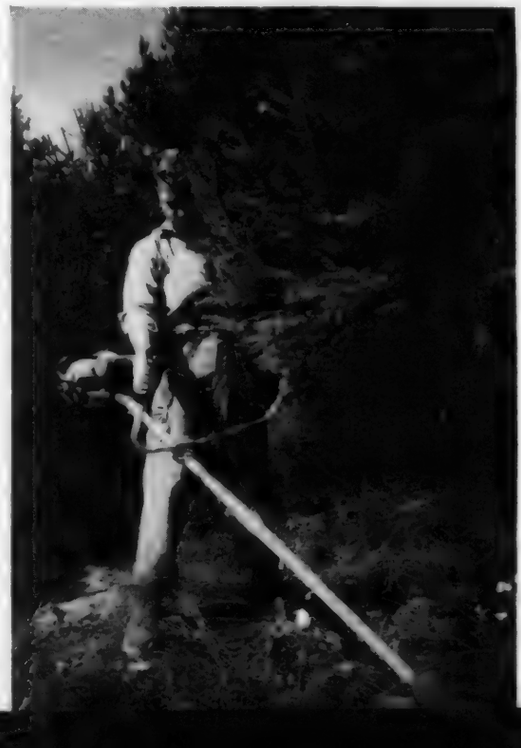
"Most people enjoy shopping for a Christmas tree. They come out to my farm each Christmas as a sort of sentimental journey. Sometimes they want to pick out their own tree in the field. Folks like to see their tree still growing. There's something about getting out in a fragrant evergreen forest on a December day that seems to pump Christmas spirit into your blood with every brisk breath you take.

"It used to be," says Bonzo, "that most of the trees on the market were wild trees from the north woods. They had to be cut early. Often the branches dropped and the needles began to shed before you could get the star fastened on the tip. By New Year's the average tree looked like a skeleton. To get all their trees shipped, big commercial tree farms still have to cut early, but the trees now are put in cold storage or wax-dipped to hold the needles. Actually I can sell my trees a little below the retail price for shipped trees and make a tidy profit, and people get a fresher tree. 'Most anyone is willing to pay a little more for a local tree if they know they won't have to apologize for its appearance the day after Christmas.

(*Continued on page* 109)


Leader, spike, or growing tip
Gooseneck—abnormally long, bare stem between whorls
Height growth for any year is distance between whorls
Pinch off terminal buds in winter
Whorl—a group of limbs growing
Handle—space between lowest whorl and cut. (1 to 1½ inches per foot of tree height)
When tree is harvested, stem will be cut here
trim tree for shape in summer
Stem, bole, or trunk

The parts of the Christmas tree and the trimming and cutting points are shown in the diagram above. On the opposite page tree-climbing grandmother Alice Lehman cuts choice greens from an otherwise unsalable tree on the shores of Lake CleElum, Washington. Below, the Hoffco 5 h.p. saw is the new tool being used by growers to harvest trees. It leaves a square butt and 1,000 trees a day can be cut against 500 with an axe. Tree butts need not be re-sawed to square them up and there are no sharp stumps left to puncture tractor tires.



HERRING

one man can handle 100 cows with this new dairy system

REVOLUTION CAME quickly but unalterably to the dairy farm this year. The upheaval was caused by an idea and, like most revolutionary ideas, this one was simple—handle cows in batches instead of as individuals and buy time with extra milking units. The dairy farmers who have adopted the system which is built around this idea have demonstrated that they can double and even triple their output with less back-breaking labor. They have changed the one-man dairy herd from 30 to 40 cows to around 100. And they have given themselves a handsome raise in pay and improved working conditions. The cause of this major break-through in cow handling is called the herringbone milking parlor.

In New Zealand, where the system was evolved, credit is given to a young farmer, Ron Sharp, of Gordonton, for designing the first herringbone parlor some five years ago. Though herringbone parlors have become popular in New Zealand, the idea did not migrate to America until last winter when two Americans, Don Golay, a farm equipment manufacturer, and Cameron Hervey, a designer of farm buildings and equipment, learned of the new method. Golay, who was making a world tour in search of new ideas for American agriculture, saw the herringbone at work in New Zealand; Hervey heard of the idea from W. G. Whittlestone, a New Zealand scientist, who sent him a set of building plans. At the time he received the plans from New Zealand, Hervey had an inquiry from Dominic Lego about building a modern, swivel-chair milking parlor for the use of his tenant, Clarence Aavang. Hervey talked the two dairy partners into trying a herringbone parlor on the Huntley, Illinois, farm. He promised to adapt the system to our climate and dairying methods and designed it so that it could be converted to a conventional parlor if they were not satisfied.

The concrete was poured and the building erected during the bitter winter months and Aavang began marching his cows through in February. There were problems from the first, but there has never been a question of discarding the herringbone for a conventional parlor.

The parlor itself consists of a central, narrow pit between two walk-ways for the cows. The vacuum and milk pipes run above the center of the pit with one milker for each pair of cows. Each walk-way, which is 30 inches above the pit, has its own entrance and exit door which is controlled by ropes from the pit. Aavang's parlor is not only the first in America, but the biggest yet built here—it holds eight cows to a side for a total of 16 at one time. When he pulls the rope the cows walk in from the holding area until eight of them are crowded along the walk. Since eight won't fit, head to tail, along the walk and since their feed boxes are along the outer wall, they turn at a 45 degree angle with their milking end toward the pit in the perfect position for the operator. In this position, they make a snug pack. There are no stanchions of any kind, but the close fit of the cows keeps them from moving. When both sides of the parlor are filled, you get the herringbone effect that gives the parlor its name.

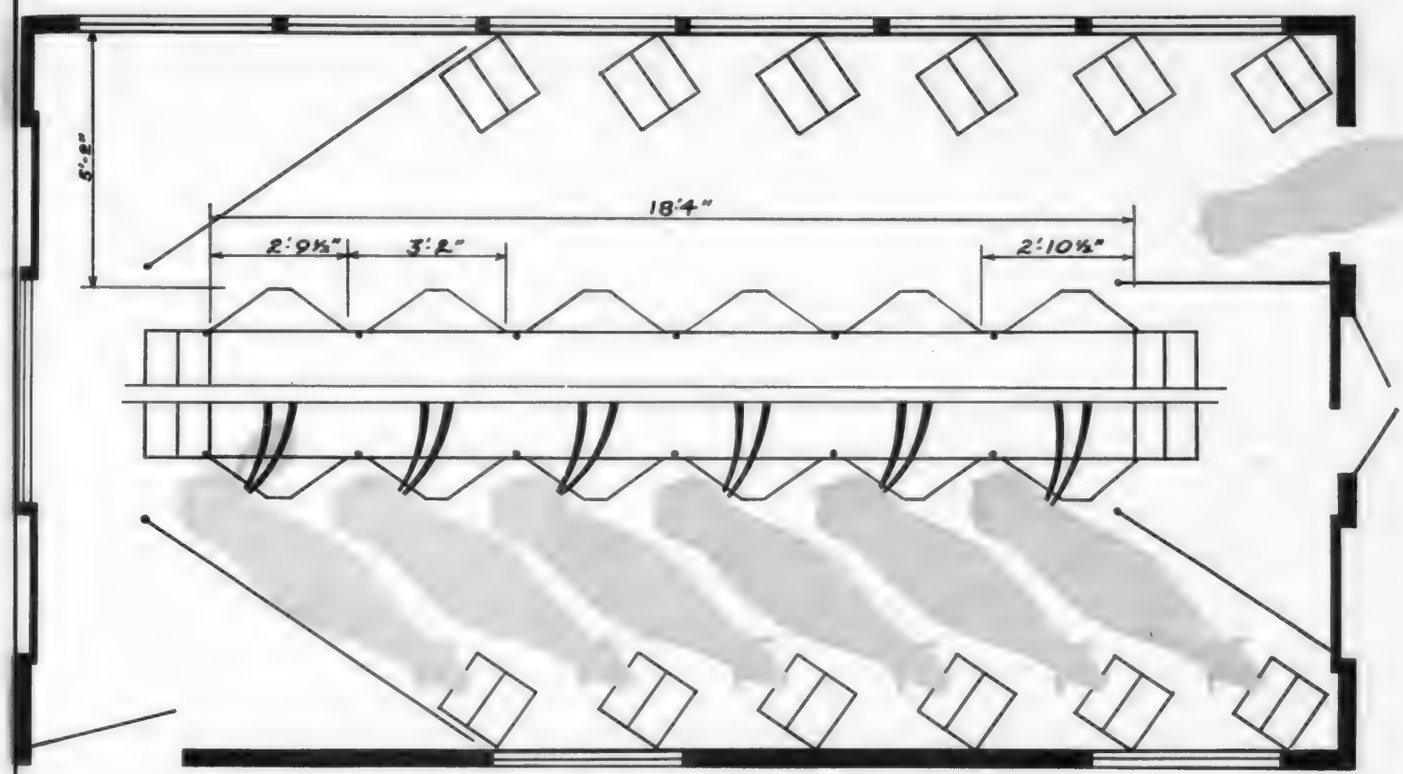
Aavang starts the milking procedure at the entrance end of the pit. Here, he has the control ropes which operate both entrance and exit doors. As the eighth cow enters, he closes the door and packs them into position by lowering a bar across the walk-way. He then feeds each cow (by pulling a rope which meters out exact amounts of feed—a quart to the pull) and sprays her udder to begin loosening the dirt. This procedure carries him to the exit end of the pit and he then starts back washing the first four cows, hand milking a squirt from each quarter and putting on the milkers. Then he washes the next four and places milkers on them. As he reaches the entrance end, he lets in the eight cows on the opposite side of the pit and continues the process. Milkers are transferred across the narrow pit from the first line of cows to the second eight, then the first group are let out into the feed lot, a new group brought in, and the cycle is repeated. On the day the photographs shown here were taken, a stop-watch was held on Aavang without his knowledge. In spite of a slow-down because of strangers and lights in the parlor, he milked 60 cows in 57 minutes, 48 seconds. In doing this he used a milker for every 7½ cows or about twice as many milkers as most dairymen would use on a herd this size.

Aavang has been in dairying all of his 36 years. Four years ago he moved from a 147 acre farm to the present 220 acre farm. The move was not primarily to increase acreage, but was due to the limitation on income imposed on him by a new 36-cow stanchion barn which he felt was inflexible as far as increasing herd size was concerned. The new farm was not much better at first. It had a larger barn, but it was older and somewhat less efficient.

Bad luck struck. He lost half the herd from Bangs and a few more from mastitis due, he felt, to stalls that were too short and to mixing herds. To recoup his losses, he built up the herd to 50 cows. "I milked fifty cows morning and night alone

BONE

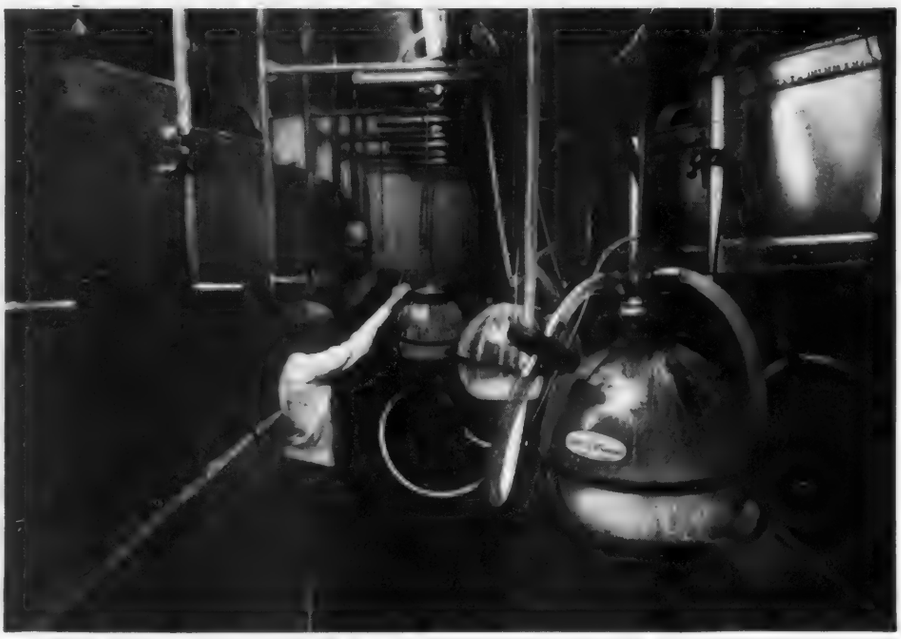
Angle parking to save space, batch handling, and the use of extra milking machines have reduced the time and labor involved in dairying. Though the designs of different parlors vary in detail, the simplified plan shown below illustrates how all of them work. Clarence Aavang (left) transfers one of eight milking machines across the pit.



except that my wife carried the milk," Aavang recalls. "It took two hours each milking plus extra time for clean-up and feeding. Along with my other work, it was just too much. We were dead tired all the time and I think I got arthritis from the bending and squatting—at least my joints never stopped aching. Now, I milk sixty cows in half the time and without any help and—you may not believe this, but—when I'm finished I actually feel refreshed. I've accomplished something and I'm not tired."

The cost of the milking parlor, milk room, office, bulk tank, pipe line and milkers along with a loose housing shed came to $22,000. Although he still has drainage problems to take care of at the loose housing shed, and a new hay-feeding rack to build, his main expenses are taken care of for the 100-cow herd he is building. He is stretching the feed-growing capacity of the 200-acre farm by keeping his cows in the feedlot the year around and feeding them hay and silage winter and summer.

Cows wait their turns to be milked in the holding pen as a batch from one side of the herringbone is turned loose. Some operators have found that separating all slow milkers and running them through together adds to the parlor's efficiency.



The prefabricated, six to a side, herringbone (above) was erected in a day and a half after the foundation was poured. The single-row parlor under construction (below) makes use of an old barn as a loafing shed.

The Aavang parlor gives a good idea of how the herringbone works and how it increases the value of a farmer's labor three fold. Such parlors are being put on the market by Hervey, by the Clay Equipment Corporation, who have done a lot of the pioneer work in push-button dairying, by Kaiser Aluminum Company, who are pushing the Hervey design, and by the Chore-Boy Division of Farmer Feeder Company, whose President, Don Golay, brought the herringbone idea back to America. The Chore-Boy herringbone is, incidentally, the first complete unit—building, milking machine, pipe line, and milk-room equipment except for the bulk tank—on the market. The package lists for $7,825 F.O.B. Cambridge City, Indiana.

The first of these six-cows-to-a-side package units was bought by Robert and Donald Buckland, of Richmond, Indiana. Bob Buckland, who usually handles the milking of the herd, said, "It is hard today to foresee the future. We started with a herd of Milking Shorthorns and a stanchion barn. We sold the herd when Don and I both felt the Army breathing down our necks. After the war, we began again with one Holstein cow and gradually built up to where we were milking twenty—which I thought would be as big as we would ever want to be. But I've got two boys that like dairying and you have to have more cows today to make a living—so we just had to expand.

"I'll say this about the herringbone—it looks better to us every day. When we first saw it, Don and I both said we'd never have one on the place. But, we went back again and, you know, it didn't look half bad. About the third trip we bought one and since actually using it I like it better and better.

"It can't compare with our old four-cow milking parlor—which we used between the time of the stanchion barn and the herringbone—when it comes to a herd of twenty or thirty cows," Buckland said, "but for a big herd it can't be beat. And we are building a big herd. We have a herd average of between 14,000 and 15,000 pounds of milk and a little over 500 pounds of butterfat and it is hard to decide whether to take time and raise our replacements or to risk buying cows, but we are determined to grow.

"In numbers of cows, I can't say how big we will go," Buckland continued. "My aim is to produce a ton of milk an hour with this parlor and the fewer cows I can do it with the better."

The Buckland parlor came to them in prefabricated panels ready for assembly. The brothers poured the foundation and erected the building themselves. "We were told that we should be careful about getting the foundation exact. We took extra pains and it sure paid off. After the foundation was finished, it took us just a day and a half to put up the building. We were able to see that if we'd had a sloppy foundation, erecting would have been a horrible headache instead of going up like a jig-saw puzzle as it did."

The Buckland brothers feel that the small, conventional milking parlor is more efficient for the herd of 20 cows and the herringbone for the 80- to 100-cow herd. Don Golay would agree with this analysis and has designed an ingenious, one-sided herringbone for the 30- to 70-cow herd.

A single-row herringbone may sound like a filet and at first glance may seem to lose all of the advantages the system offers. One part of the system, after all, depends on the preparation of one line of cows while the other is being milked.

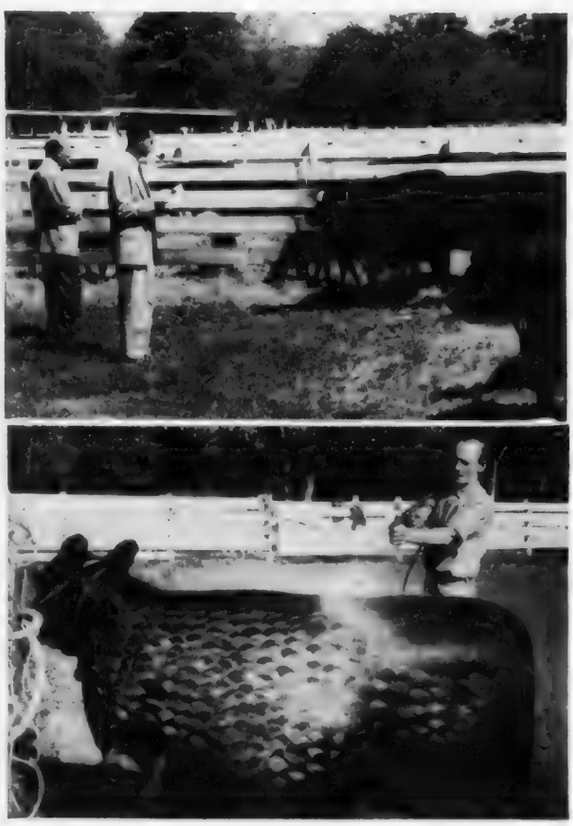
(*Continued on page* 85)

Vacuum door openers are a feature of the prefab parlor (above). Robert Bishop (right) can be seen through the milk-house door in his ten-cow single-row parlor.

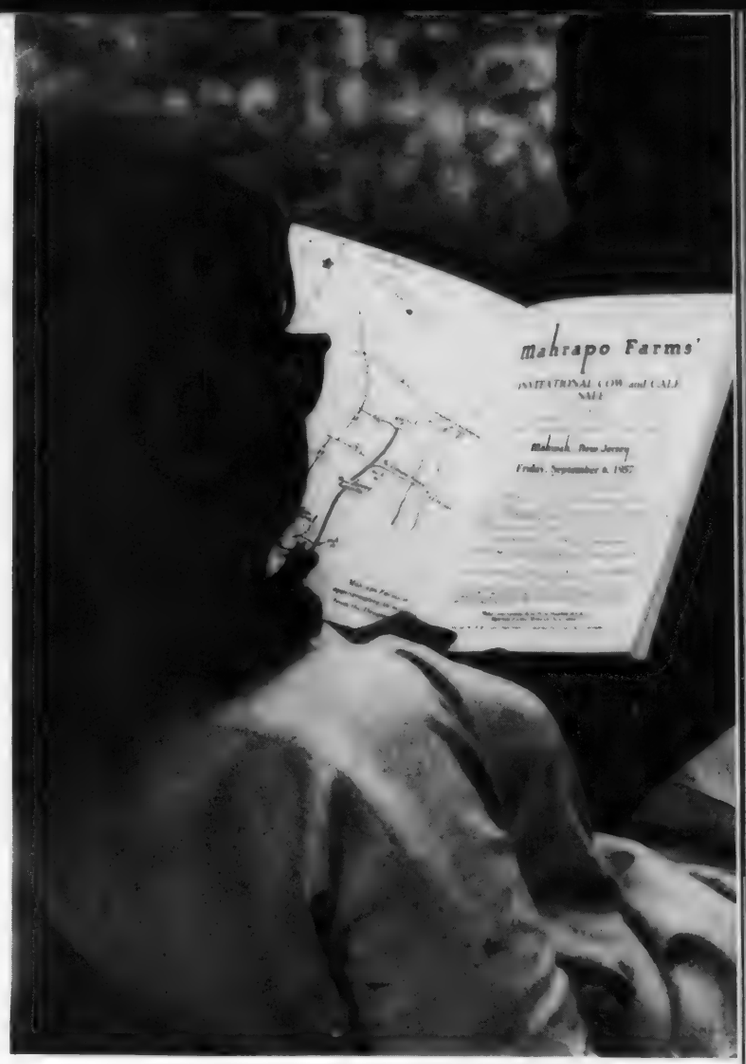
The Old Sale Barn Was

The calm before the storm. It's mid-morning on sale day. The straw lies belly-deep in the ring; the numbers are in order; the mike is ready; catalogs are at hand, and the PA blares an odd medley of "Mary Ann," "Waterboy" and tunes from the standard musicals while sale manager J. B. McCorkle (above) wonders where the buyers are.

Stephen Birch, Jr., host consignor, checks an important point with a lady visitor while prospective buyers inspect the offerings in a paddock and a herdsman puts a finish like hammered silver on a heifer. Cow with eye patch (upper right) had a prolapsed eye.



Three Eastern Angus Breeders stage a blue chip sale with all the glamour of a Broadway opening



Never Like This!

Photographs: Fred Knoop
Text: Charles R. Koch

THE STETSON HAT, cowboy boot crowd that patronizes the western sales rings would find itself completely out of place at an eastern purebred auction. Here the atmosphere of Broadway and Wall Street predominates. Most of the buyers come "dressed as you are," which means prepared to go to a board of directors' meeting, and the setting is one of colorful elegance with bright red bleachers welcoming the prospective bidders under a tent of the same striped design found in the curb-to-door canopy of the Stork Club.

Angus breeder Stephen Birch, Jr., staged one of these glamour sales at his Mahrapo Farms, Mahwah, New Jersey, last fall and invited neighbors Eugene Denton, of White Gates Farms, and William Mennen, of Hideaway Farm and talcum powder fame, to participate in the festivities. The event was billed as an Invitational Cow and Calf Sale.

Most of the offerings boasted pedigrees of the most royal lineage and many of them were, both in breeding and type, among the best the breed has to offer.

Three of the top auctioneers of the cattle world, Roy Johnston, Hamilton James, and Ray Sims, presided in the stands. Frank Richards, Secretary of the Association, was on hand to attest to the quality of the carefully selected cows and heifers.

Hours before Roy Johnston called for the opening bid, affluent buyers—as well known in the securities as in the livestock markets—clambered over paddock fences and eased into stalls, prodding a loin, pinching a flank, standing back to let a black hide fill the

"I paid $7,500 for a full sister to the third dam of that Edna Eileen heifer. This one should sell for that much, maybe more."

During a lull in the sale Keiki Keshner, a knowledgable beauty from the Show-Me State, makes a hasty appraisal of the market with her husband, "Confucius" Joe (back to camera), and Roland Stanfield, of Tulsa. The Keshners operate the Good Earth Stock Farm, a big Angus establishment at New Florence, Missouri.

Neighboring celebrities, actor Burgess Meredith (in straw hat), cartoonist Bill Mauldin (in cap) and playwright *(High Society, Tea House of the August Moon)* John Patrick, lent glamour to the sale. Spectators and fellow buyers enthusiastically applauded (below) the buyer of the first offering, a $10,100 heifer.

A press photographer from the big town was dumbfounded at the shop talk around the ring. "Geeze," he wondered, "do these people always feed each other snowdrops like this?"

"Another hundred, sir? Will you give me another hundred?" Flanked by McCorkle and Birch, auctioneer Roy Johnston, one of three who cried the sale, pleads with a reluctant buyer. Johnston devoted 30 minutes of auctioneering artistry to the first offering, which set the tone of the sale. Hamilton James (far left) asks, "Are you all done?" on a cow from Hideaway Farm.

"All right, what am I bid? Do I hear a thousand for this Blackcap Missie?" In surroundings more like a garden party than a cattle sale, the auctioneer mesmerizes the crowd with his chant as herdsman Buster Sparkman moves a blue-blooded heifer around the ring.

No star of stage or screen was ever more carefully made up than these heifers receiving the final touches before entering the ring.

eye while matching the image with the pedigree and particulars set down in a well-thumbed catalog.

Then the auctioneers began their chants, the same good, old, raucous razzle-dazzle with its lulls of intimate pleading that can be heard around any sales ring from Boston Commons to the Cow Palace.

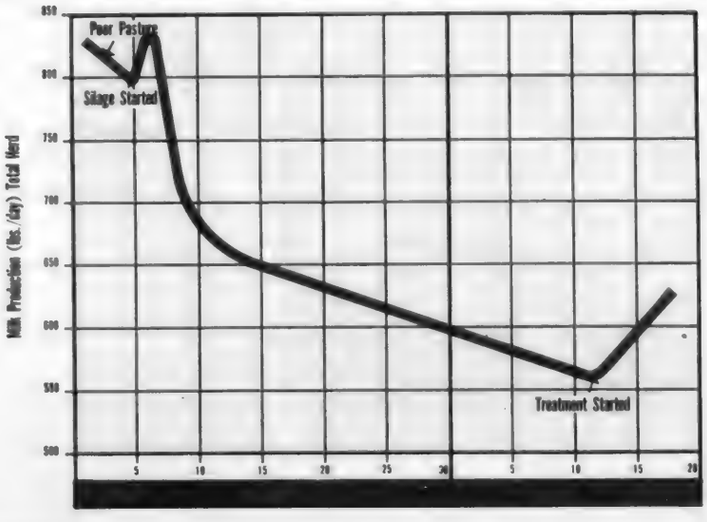
"All right, what am I bid? She's a breedy cow, boys, with a lot of depth of body and a heifer calf with her. She's good for years and she's going to get better. A thousand? Thank you, sir! Do I hear two?"

And 58 head averaged $1,266.

The pay-off comes at the clerk's table.

The Case of the

New research reveals simple controls for the prevention of livestock losses and depressed milk production caused by forage feeding hazards



Naughty Nitrates

By Charles R. Koch

THERE'S A REASON for everything. When steers break off in diarrhea before they approach full feed, when silage "doesn't feed out right," cows drop off in milk production, lose their calves, even die of a sudden, for unexplained reasons, and silos spew out noxious gasses which cripple and kill farm workers, there is a culprit at work somewhere. Investigation is showing that the cause is the peculiar growth pattern of plants under stresses, such as drouth or insufficient sunlight, through which they store up an excess of inorganic nitrates.

Actually, there is nothing new about this. Farmers and research workers have been struggling with the symptoms for the past 60 years or more, without knowing the cause. The first time any one bothered to make a note about it in scientific literature, seems to have been back in 1895 when N. S. Mayo, head of the Veterinary Department at Kansas State, set down his observations on some cattle which had been poisoned by nitrate of potash which they apparently picked up from forage grown on highly manured ground.

On some of the marsh lands of central Wisconsin it has been common knowledge for years that cows will abort when turned out on weedy native pastures in late spring or early summer and that there will often be a recurrence of this phenomenon in early fall. So certain is this to happen that the old timers in the area always breed their cows to freshen in the spring before the danger period sets in.

All kinds of theories were advanced to explain the situation. Some said it was the soft, marshy ground that caused the trouble; others blamed it on the water; the fungi on dead grass was suspect; and some were certain that the rocking of the cow as she moved across the hummocky ground shook the fetus loose.

Then, down in Missouri, the summer of 1954 was one of intense drouth. The corn had thrown in the towel by the middle of July in many sections and farmers, by that date, were either pasturing the seared stalk fields or salvaging what they could as silage. A wave of cattle deaths began to sweep across the state, starting down toward the southeast corner and working west and north, day by day. The dead wagons had never known such busy times and the trouble persisted right on through the winter and spring while drouth-stricken forage was fed out of silo and haymow.

The theory advanced at first was that the malady was caused by some kind of virus carried by pigeons. Pigeons are always roosting in haymows and silos, spreading their droppings liberally. Could there not be some connection between them and the trouble? But the breadth of the epidemic and its varied forms soon knocked this idea in the head.

Little by little the evidence was pieced together until it became apparent that it was nitrate which was causing the abortions in Wisconsin as well as the deaths in Missouri and was expressing itself in a number of other costly troubles as well. No one will yet venture to say exactly how the damage is done, but enough is known to indicate that the problem can be lived with until it is eliminated. Ruminants seem to be the principal sufferers. Cattle are hit much harder than sheep.

Like many scientific advances, the nitrate problem finally received attention because of economic pressures and the insistence of a handful of individuals. For example, Al Brown, a husky, young Nebraska cattleman, had married a girl from central Wisconsin. On their visits up north, Al had been struck by what looked to him like tremendous land bargains in the marsh area of the central part of the state. Here was deep, black, muck land that grew beautiful grass and was well watered. Two acres could give a cow and calf a good living. Best of all it could be bought right—well under $100 per acre. Where could you match that?

So Al bought better than 300 acres south of Stevens Point, all but 80 of it in the marsh, and moved 20 Holstein cows up from Nebraska in the fall of 1952. Of those 20 cows only one produced a live calf the next spring. That same spring he brought in 30 Hereford cows. Twenty-two of these aborted. In 1954 his beef and dairy herds chalked up a total of 27 abortions and Al knew something was wrong. It wasn't Bangs. The cattle had all been tested and were clean. After aborting they would go through a "crazy heat" period, breed again, and, very likely, abort again.

A neighbor of Brown's, Art Johnson, was among others having the same trouble. He, too, had bought a marsh farm and moved in in 1952. He lost 7 calves the first month. The following year he lost 8 more. Then, as he says, "I got hostile. For fifty years the people up here had been losing calves. Most of them didn't want to say anything about it for fear authorities would say they had Bangs in their herds. Some of them had an idea it was nettles that were causing the trouble. But I decided to do something about it, so I went down to the college and said we had to have some action. They sent six veterinarians and six agronomists up here and they went all over this place, taking samples of soils and grasses and weeds and inspecting the cattle, but still they couldn't put their fingers on anything."

But that was only the beginning. After the usual starting difficulties, the college went to work on the problem in earnest.

(*Continued on page* 118)

No matter how good it looks, sometimes silage (opposite page) doesn't "feed out." The reason may be nitrates. The chart shows what happened to production in one dairy herd taken off poor pasture and put on silage. Production jumped up, then went into a long decline until molasses was added to the ration. A high nitrate condition in weeds causes abortions in the marsh lands of Wisconsin. As Dr. Frank Douglas (above) checks a heifer for pregnancy, Julian Sund of the U. of Wisconsin agronomy staff, records the results. Sund discusses the problem (right) with Art Johnson, a prime mover in the drive to eradicate the hazard.

CHICKEN RECORDS make the difference

By Pauline Harland

MY GRANDMOTHER'S chicken records, and my own for many years, was a cracked sugar bowl in the cupboard where she kept her egg money. As long as there were a few nickles and dimes in the bowl, the hens were doing all right. Today you have to be a bookkeeper and a statistician to make chickens pay. I found that out five years ago when we began to run our hen house along modern lines.

When we were operating old style, we had an unknown number of chickens of mixed ancestry. Some of them roosted in a ramshackle henhouse, others in the barn and toolshed. Come spring we'd set a few hens and others stole their nests out in the weeds. We fed them occasionally by shelling a few ears of corn on the ground, near the corn crib, and we buried an indeterminate number of casualties in the garden. Gathering eggs was like a treasure hunt, and sometimes we got so fond of a hen that she died of old age. As I look back now, I can see that a profit-and-loss statement on that kind of an operation would have been a really amazing thing.

When we talked to a number of people who were successful in the business of producing eggs, they all agreed on one thing —you have to keep records. "You can do everything else according to the book," they said, "but if you don't keep records you won't know whether you're going or coming."

So we started to keep records.

Without any additional investment in housing, but better management with the buildings already on the farm, we reduced the cost per dozen of producing eggs from 27 cents to 21 cents. All the multitude of "leaks" in our management began to show up, one by one, when we started to keep records.

We not only had to learn new management, but we also had to learn how to keep accurate records. For advice and guidance we turned to the Iowa Poultry Extension Service, headed by W. R. Whitfield, who has done so much for the poultry business in Iowa.

We joined the Demonstration Poultry Program and launched a sort of Five Year Plan of record keeping. Each month we report to the Department, and if we need advice or information we call up the Taylor County Extension Service.

As I worked my way through the first year of record keeping, I was continually being surprised at what I learned from the records. One of the first surprises came on mortality rates. This sneak thief was depleting our flock, week by week, and we scarcely knew he was around. With accurate records we found the percentage loss amounted to a much larger figure than we supposed. Having seen how large our death loss actually was, we began to look for the cause and how to correct it.

The laying flock mortality was 25.5 per cent in 1953, rose to 51.7 per cent in 1954, dropped to 17.5 in 1955, and, best of all, dropped to 3.7 per cent in 1956. This is about as low as a mortality figure can drop.

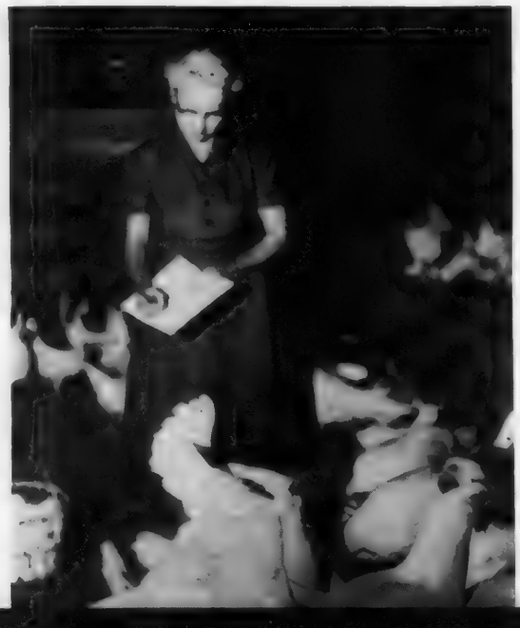
An unfortunate encounter with leucosis, the commonest of all poultry diseases in our area, accounted for the high death loss in 1953 and 1954, the first and second years of the record. What did we do to reduce the loss to 3.7 per cent? We hadn't realized that baby chicks are most susceptible to this disease in the first eight weeks of their life.

On the advice of W. R. Whitfield we segregated the chicks, moving them 400 feet from the old hens. We cleaned and disinfected the brooder house and began a strict sanitation program which included disinfecting our shoes every time we stepped into the brooder house. The first eight weeks of a chick's life are the most critical. Mr. Whitfield says, "The first eight-week period is when the chicks are the most susceptible to fowl leucosis. If you think you can get by with housing chicks and hens together you should remember that there is not a flock of hens that may not have some carriers of leucosis in it. It is also impossible to avoid the spread to the chicks when they are housed together. The incidence of this disease is much higher when chicks and hens are confined in houses less than 400 feet apart."

Leucosis is a sly killer, biding its time to strike. Often we are not aware there is anything wrong until the hens reach maturity and begin to lay. Then it may be death due to an enlarged liver in one or paralysis in the leg or wing of another, but week by week, the death toll mounts.

Our experience with leucosis in 1953 and 1954 was a painful lesson, but we'll not soon forget that carelessness with sanitation can be ruinous. We gave the laying house the same treatment as we gave the brooder house—plenty of soap suds and lye water and a thorough cleaning between flocks. We no longer used borrowed coops and we kept a tray of disinfectant near the door—everybody who entered had to step through it. We used a deep litter of ground corn cobs and saw that the feed trays and waterers were scrupulously clean at all times. A hen that shows the least sign of feeling poorly is immediately segregated. We've had three casualties in this year's flock—possibly the hens were injured when we moved the flock into the laying house. I'm sure it was not disease that took them.

Record keeping soon points up the damage the free loader does to profits, so we cull closely. The first culling comes after the hens have been laying about 8 months. We use the pigment method, recom-



Mrs. Harland keeps her egg record pad (left) hanging in the hen house. She uses the pigment method (right) in culling and inspects the layers regularly for bright comb, sharp eye, skin color, and feather condition.

mended by the Iowa Poultry Extension. A laying hen has white legs and beak and her comb and wattles are large, smooth and full. Her feathers are worn, for a hard-working hen can not stay slick and dressed up. Her eye will be bright and saucy and she'll do a great deal of singing and small talk. As soon as she quits laying the yellow comes back and into the pot she goes. After a while, if you watch the flock carefully and gain experience, you'll develop a sixth sense to supplement your knowledge in culling.

Until we started keeping records we had only a dim idea of how big a factor feed is in the cost of production. It didn't take us long to learn that it's the biggest cost, fully two-thirds, and that we were feeding too much. When we started we were feeding 111 pounds per bird per year; by 1956 we had reduced that to 88 pounds, which is about the minimum to maintain body weight and still produce eggs. How did we do it?

First, we bought a lighter, Leghorn-type hen which could produce on less feed, since it takes less to maintain her body weight. Then we began to use a higher protein supplement (32 per cent protein) to feed cafeteria style with corn and oats, using our home-grown grains. Last year the total cost of the ration averaged $3.12 per hundred pounds. I buy 70 bushels of oats and 70 bushels of shelled corn (all our storage shed will hold) from my husband at market price. I'm a believer in oats as one of the best grain feeds for laying hens. They must be good oats; a hen knows—she won't eat a light, chaffy oat.

We discarded some old, inefficient, broken-down feeders and replaced them with new metal feeders. We debated a long time about laying out the money for new feeders, but it was a wise move.

The new 5-foot feeders (providing 10 feet of feeder space) cost $6.75. Figuring 6 inches feeding space per hen, this would provide room for 20 hens. Feeders are estimated to last 10 years, so that the cost per year would be 67 cents to use each feeder, or 3⅓ cents per hen. Our new model hen and the new feeders saved us 76 cents per hen on a year's feed bill. Why hadn't we bought new feeders long ago? When we saw the figures in black and white, we realized we couldn't afford not to buy them.

Another saving came when we learned how to feed. We never fill feeders more than half full. Hens have a tendency to "bill out" feed. They're women, and like women shoppers, they like to sort to the bottom of the bargain pile to see if something better might be down there.

Since we had always fed home-grown grains, and had fed without weighing or measuring, we had no idea of feed costs. Our records showed that poor feeding equipment and filling the feeders too full have robbed us of many a hard-earned penny.

We used feeders with perpendicular sides. Those that slope outward, as some do, make it easier for the hens to spoon the feed out. A lip on the edge of the feeder is of no value if the bird can pull the feed toward her so that it reaches the top of the feeder.

Pounds of feed per dozen eggs was reduced from 5.2 in 1953 to 4.3 in 1956, with a corresponding lowering in total cost per dozen eggs.

Poultry experts have a good deal to say about the importance of water to a laying flock, but unless you keep records you're likely to be careless about this point. An egg is mostly water (about two-thirds); water is cheap, so why not pour it on. A hen eats a while, runs to the water, takes a sip of water, eats some more, and takes another sip. She can't eat dry feed unless she has a water chaser. Good fresh water ought to be handy (so that no hen walks more than ten feet for a drink) and she shouldn't be crowded. We designed our water supply along strict mathematical lines, and I made it easy for myself by using a bit of psychology on my husband. "Look," I said, "you have pipes to the stock tank. Why not lay pipes to the chicken house—I make too many trips with a heavy bucket."

So, we invested 76 hard dollars on pipes and waterers. We have two 40-inch waterers, which, allowing an inch for each hen, accommodate 180 all told. Then, for good measure, we added an automatic waterer which is 13 inches on each side. This waterer has an automatic heater and the two larger units are wired for heat, and have thermostats. When I feed I check the automatic and fill the other two manually.

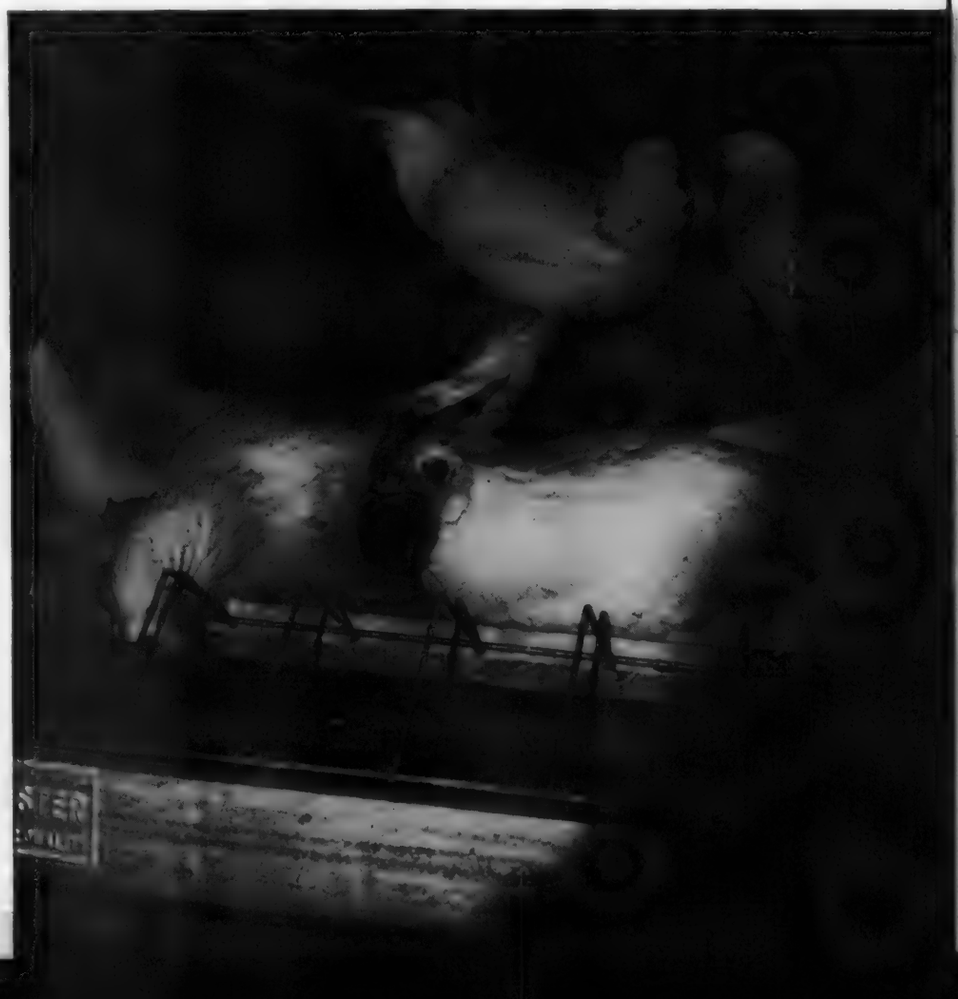
Spreading the cost over 15 years, the life of the watering equipment, the cost amounts to $5.06 per year, or 1½ cents per day. Would I carry water by the bucket for 1½ cents a day? I would not! I am convinced that sufficient watering space and good, fresh water is the most neglected management practice in the average farm flock, and one of the easiest and most inexpensive shortcomings to remedy.

What is Time Worth?

Now what did record keeping show us about work time, a factor so often overlooked altogether, or casually lumped off. How does the time I spend caring for our flock compare with the time others spend caring for theirs? When I began counting time, I was distressed by the time and effort spent in long trips to the granary, which was a hundred yards away, near the barn. This was fine for my husband and his hogs, but doggoned inconvenient for me and my chickens.

A lot of time could be saved by storing the feed nearer the poultry house. Not having room for feed storage inside the laying house, my husband moved a building (used in former years as a coal house)

Each hen is given six inches of feeder space. The feeders have vertical sides to prevent spooning out of feed. They are never filled more than half full. Feed is a mixture of whole home-grown grain and a laying mash. Each feeder is within handy walking distance of the waterers.



to a location near the poultry house. By spending $50 for a new cement floor, and bins inside for grain and mash, the convenience is something I'm grateful for every day. This move wouldn't have been made if I hadn't started keeping time on the poultry chores.

The Total Operation

Ours is a small flock, 170 layers now in the laying house. That is the capacity of the building, allowing 3 square feet for each bird. My husband is busy with his fields and cattle and hogs, so the chickens are mostly my chore, which I must of necessity make a part-time one.

This, in brief, is how we operate: we buy our chicks, a hybrid cross, on March 12, give a day or two each way, and we pay tops, around 60 cents each, for pullets. We bring them home and they go into a spick-and-span brooder. They have plenty of good grass range, chick starter and ground grain until they are five months old, when they are brought into the laying house where they spend the remainder of their productive lives. At five months 40 per cent of them are laying.

This is around August 12, and they're here for exactly a year. If we sell them to a produce house, we'll rarely get our chick price back—10 cents a pound, or about 45 cents each. For the last two years we have sold them, at almost double that price, to neighbors who keep them as layers for another year. They fall sharply in egg production and quality the second year, become more susceptible to disease, and can't stand the summer heat as well as year-old pullets. But the neighbors know they are a profitable buy, for it costs us $1.50 to buy a chick and bring it up to laying.

We sell the eggs to a produce station and, of course, we are rarely happy about prices. Our records show that 21 cents per dozen is our break-even point and from last January to July we got only one cent to four cents above that for Grade A eggs. But since July the price has been edging up and we're now getting 40 cents for Grade A large.

We had our best year in production in 1955 when our flock took first prize in the state Demonstration Program—that was 267 eggs average per hen. We won't do as well this year—we were late getting them into the laying house and when we went on vacation the hens seemed to miss me and let down.

The amount of feed required for a dozen eggs has gone steadily down. In 1953, the first year of our records, it was 5.2 pounds, and the same the following year. In 1955 it dropped to 4.4, in 1956

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Only a few steps separate the henhouse from the feed storage shed, a made-over coal house. Mrs. Harland formerly toted feed from a granary one hundred yards away She buys oats and corn from her husband at market prices and bases her records on these prices.

Visitors are asked to step through a tray (right) of disinfectant before entering the henhouse. Mrs. Harland's hens (far right) display the usual curiosity about their creations.

How Much is a Pasture Worth?

WOULD YOU SETTLE for $100 an acre from your pastures?

If you would, there are a lot of good Wisconsin dairymen who would say you are easily satisfied. These are the farmers who are cooperating with Wisconsin's Grassland Farming Program under the direction of George Werner, of the Dairy Husbandry Department, and Vic Burcalow, of the Agronomy Department. Two to three hundred farmers participate in this program every year; and their returns make pasture a top per acre investment.

In Sheboygan County there were a dozen farmers who netted upwards of $90 of milk per acre in 1956; and the champion of them all, Henry Johanning, milked his pastures for $319.90 per acre.

These are things a man just doesn't do overnight. You wouldn't expect to take a squad of boys who had never seen a basketball, work them out a few times and go up to Madison Square Garden and win the N.I.T. It's the same in the dairy business. It takes conditioning and it takes team work. The farmer is the coach and the team is cattle and land. The coach has to get what he can out of that combination.

Glenn Lycan, County Agent of Sheboygan County, in analyzing the remarkable records of his top dairymen stresses that net return depends upon four factors:

(1) the ability of the cows to produce economically;
(2) the lactation stage of the herd;
(3) the feeding efficiency of the farmer; and
(4) the quality of the pasture.

Many dairymen, dissatisfied with the inability of their pastures to carry more than a half to one cow to the acre, on the average, or to produce more than $50 or so in milk, even during the lush season, are turning these long winter evenings into some of the most profitable hours of the year by concentrating on how to use their cows and land to the utmost advantage. They could hardly do better in their planning than to be guided by the experience of these masters of meadow management.

Assuming that one's cows are good producers and qualify under the first factor above, that they have been bred to freshen at the most advantageous time viewed in the light of the milk market and pasture conditions (factor number two), and that the farmer has been in the game long enough to have acquired the basic skills in feeding demanded as the third factor, here are the experts' tips on how to make that pasture pay off.

Take Johanning's $319.90 per acre. He hit that record with 52 Jersey cows on 12 acres of alfalfa, brome, Ladino pasture. He turned them in the field on May 28 and they grazed it for 89 days during which time he controlled their grazing activity by holding them in small strips with an electric fence which he moved two or three times a day, thus forcing them to utilize every whisp of forage to the utmost advantage. The result was 105,366 pounds of 5 per cent butterfat milk that brought $4530.74.

Johanning did not skimp on feeding the concentrates in making this record. He fed a pound of grain for every 6.5 pounds of milk, running his grain bill up to $691.87; but during the pasture period he fed no hay and no silage so the grain was his only additional expense. Deducting the grain bill (and, incidentally, most of these grains were home-grown) from the milk income leaves a balance of $3838.87 to credit to 12 acres of pasture for the average of $319.90.

It took only .23 acres to carry a cow—approximately 4 cows to the acre. The cost of feed per 100 pounds of milk (3.5 per cent butterfat) was 49.7 cents. It was estimated that he took 5068 pounds of T.D.N. per acre from this pasture, the equivalent of a yield of almost 100 bushels of corn. But even at $1.40 a bushel the corn would have been worth only $140.

Look, No Mirrors

The only mystifying thing about this amazing performance is that it was accomplished without the aid of any secret devices. It was just a simple combination of cows and managerial skill with the emphasis on the latter.

Johanning started working on his pas-

Wisconsin dairymen collect up to $320 an acre with strip grazing and high quality forage

ture program back in 1942. He cut 14 acres of grazing land into three strips and was rewarded with a pleasant surprise in increased production. Since then he has never permitted his cows any freedom of choice in grazing.

In establishing his record he followed his current system of moving his electric fence three times a day, at 8:00 in the morning, at 2:00, and after the evening milking. The size of the strips depends upon the quality of the grazing and the stage of growth of the grass and legumes, but they are seldom more than two acres.

Henry Johanning (above) moves his electric fence to put his Jerseys on fresh grazing. Henry Prange (below) checks production with his milk hauler.

Johanning claims he has practically eliminated bloat with this system of intense grazing and this despite the fact his pastures are richer than a double hot fudge sundae with a whipped cream top. His theory is that the prime cause of bloat is the tops of the alfalfa and clover plants. The tops are particularly palatable and if the cattle are allowed to range freely over an extensive area they will feast almost exclusively on tops before going after the remainder of the plant. There, says Johanning, is where the trouble starts. If they are forced to eat the whole plant they get a properly balanced intake in the rumen and there is no bloat trouble. Whether or not this theory will hold water is open to question, but the fact is that the Johanning cows graze his pastures with never a sign of trouble.

The soils in Johanning's area seldom need lime, but they get a dose of 500 pounds of 5-20-20 at seeding in the spring and a top dressing of 500 pounds of either 0-20-20 or 10-10-10 early in the spring every year while they remain in meadow. Sometimes he skips the application of the mixed fertilizer and gives the land 200 to 250 pounds of muriate of potash to pull the alfalfa through. The feeling seems to be growing among observant farmers and agronomists that the time to put phosphate on is when the ground has been torn up for a new seeding—give it enough at that time to last through the rotation. Muriate of potash, a highly important food for alfalfa, is absorbed readily when top-dressed, but the phosphate needs some help to work in. The top-dressed phosphate is not wasted, but it may take a whole season or more before it becomes effective.

The same principle applies where lime is needed, too. To really do its work lime must be applied a good six months before the crop is planted.

Johanning's seed mixture is 8 to 10 pounds of alfalfa, 1 pound of Ladino clover and 1 pound of brome grass. Ladino, he feels, "can't be beat for milk production"; but in the long run for hay, for pasture and for milk production, alfalfa is his favorite. Ranger is the variety he is currently using.

This hard-headed dairyman isn't one to accept someone else's word on the value of fertilization. He's the kind of fellow who builds or rebuilds his field and barn equipment when the store-bought stuff doesn't do the job the way he thinks it should be done. He has a huge self-unloading forage wagon, 9 feet by 16 feet, with 9-ft. sides, which he built himself because he could not buy the

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JUDD McKNIGHT

built a sheep kingdom

By Frank Farmer

Photographs by Joe Munroe

ON A FALL MORNING in 1901 Judd McKnight stood on a headland above the Pecos River in New Mexico and watched his herd of 1100 mortgaged sheep snake down the dusty trail to the river. Judd was nineteen years old and he had two dollars and some loose change in his pocket.

Judd and his sheep had come a long way—from Eldorado, Oklahoma, across the Texas Panhandle and into southeastern New Mexico, a dry, dusty trek of close to 400 miles, not counting the meanderings of a herd of sheep. His jeans were patched, his boots were run down and his sheep needed salt. Winter was coming on.

But if Judd was bad off he didn't know it, for as he stood there above the Pecos a dream took shape—a dream that until now had been only a vague, nameless urge that made him restless, and kept him always on the move.

Now he knew what he wanted—sheep and land, land and sheep—thousands of sheep and thousands of acres of land. He saw the ochre-colored plain dotted with sheep—his own sheep, and his domain stretched away to the purple dome of El Capitan on the far horizon. He wanted to be a big man in this big land of the West. That dream was never to fade, and it carried Judd McKnight to the top over recurring drouth, two depressions, staggering debt and falling markets.

Today, fifty-six years later, Judd McKnight can stand on that same point and look out over 200,000 acres of good grazing land—the McKnight Sheep Kingdom—with 20,000 sheep grazing in tight-fenced meadows. It wasn't easy. He had no education, no inheritance, no background of family or position. But he did have one thing beyond all else—a bulldog tenacity, a singleness of purpose that shaped every move he made in the next half century. The Mexican sheep hands who knew him called him *El Chato,* The Bulldog. And Judd McKnight, at seventy-six is still The Bulldog, a hard-bitten, ruthless survivor of an era of the West when the weak perished and the meek inherited nothing.

A good many of Judd's rough-and-ready ways came from his father, Tom. Tom was a wrangler on the old Chisholm Trail when he was fourteen years old. He married and settled in Davilla, Texas, as a storekeeper. Judd was born in 1882. The McKnight family moved to Quanah, Tex., soon after Judd's birth. Then, when Judd was still a youngster, the family decided to move to Eldorado, Oklahoma, about twenty miles north across the Red River. Judd liked the move, but he did have one regret. He was in the throes of a puppy-love affair with a pretty little neighbor girl, Nannie Potts, and he shed some of his few tears at parting. He never forgot Nannie.

Tom McKnight opened a general merchandise store in Eldorado, but that petered out and he homesteaded a sand-blown farm that wasn't much good. Judd grew up there. The country settled and money was tight. The water was bitter, the farms were small, and they never seemed to raise a decent crop. But his father refused to move, perhaps because his wife died there. He remarried an Oklahoma girl.

When Judd was thirteen, he got his first, and last, exposure to book learning. It was brief. A teacher was induced to come to the community and Judd took his lunch and trudged reluctantly to the one-room school. His seatmate was a six-year-old who already knew the alphabet and could write real well. Judd felt inferior, and that is one feeling he never learned to like. He learned to write "The dog runs" that first day, and concluded that was enough for a sheep man. He never went back.

That evening when he got home he found the four sheep owned by the family had broken out of the pasture. Judd persuaded his father that he could not go back to school until he found them. During the two days it took him to find those sheep the humiliation he had suffered in school kept gnawing on his mind. He explained to his father that what he wanted most in the world was to own a herd of a hundred sheep—and you couldn't own that many sheep sitting in a schoolroom learning the three R's. Finally his father, being what he was, agreed. Judd was to take his lunch and herd the sheep, and manage the business of increasing the herd. Father and son were to be partners. Judd's first step was to get his father's permission to trade a litter of skinny no-good pigs for sheep.

Taking a pig in a sack, Judd rode to the farm of a neighbor. He found the neighbor washing up for dinner.

"I'm thirsty," Judd said.

"Light and get a drink," the neighbor invited.

Judd was invited for dinner. He put the sack under his chair and was very solicitous of the pig's welfare during the meal. Finally, his host's curiosity got the better of him. "What you got in that sack?" he asked.

"What sack?" Judd asked innocently.

"That sack under your chair."

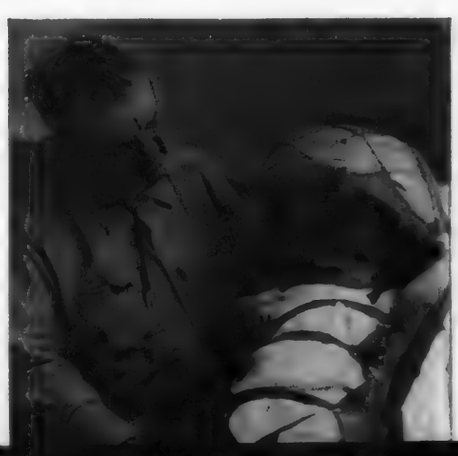
"It sounds like a pig and that's just what it is."

"What are you going to do with that pig?"

"Trade it for some sheep."

The host rolled a smoke. After a while he said, "I've got a sheep I'd like to trade for a pig." Judd McKnight made his first deal. It was mostly through young Judd's teen-age trading that the McKnights ran up their string to several hundred head.

Judd McKnight's broad nose and undershot jaw earned him the name of El Chato, The Bulldog. From a lifetime of squinting in the desert sun his shrewd eyes are almost hidden. Right, his face softens as he regards his first great-grandchild, all done up in the Indian manner. The McKnight family has had the wisdom of adapting good things from the native Mexicans and Indians. Left, a rambunctious character shows off at the annual roundup.



In the early fall comes the annual roundup, payoff time for the McKnight ranches. The sheep are brought off the ranges, the ewes and lambs sheared, culled and "toothed," and the lambs are sorted for market and breeding. The maintenance (right) of good range is not left to chance. Here cactus is being burned with a kerosene torch.

Then they mortgaged them and doubled their count.

As his ability as a trader sharpened, Judd started to fret over his lack of education. He couldn't be out-traded, but he found that he could be out-figured. He began his own schooling. He spelled out words on canned goods. While he was watching the sheep he counted sticks and pebbles, and scratched out problems in the dust with a stick.

Then one day when he was eighteen his father brought home a watermelon. It was wrapped in a Roswell, New Mexico, newspaper and it changed Judd's whole life. As he spelled out the newspaper, a great idea burst upon him. His dream was beginning to sharpen. In Roswell watermelons were a dollar each, and eggs were eight dollars a dozen. In Eldorado watermelons were ten cents each and eggs were eight cents a dozen.

Judd went to his father. "Somebody's got money down there. Maybe we could get some of it if we'd move there."

Tom McKnight shook his head, but Judd didn't forget. He hung on to his dream. A little later he heard that a man by the name of Al Garrett had drilled a well on the Blackwater River thirty-five miles northwest of Roswell and found water as pure as snow water. Judd thought of the bitter gyp water they drank in Eldorado. The dream of New Mexico taunted him day and night. He could talk of nothing except what fine country it must be, of how rich a young man could get in a country where a watermelon cost a dollar. An old friend, Hubert Blackwell, had gone to Lincoln, New Mexico, and Judd had his stepmother write Blackwell and ask him to send a map telling him how to get there. In the spring of 1901 Judd got Blackwell's map and an encouraging letter. They could range their sheep south into the Big Bend country of Texas, Blackwell said. It was raining there. The tallow weed was lush. They could fatten their sheep and sell them for good money.

Tom McKnight's resistance finally broke. On September 20, 1901, Judd and a friend, George Foster, headed the McKnight sheep toward Paducah, Texas, then to Lubbock, past the Yellow Houses division of the three-million acre XIT Ranch in West Texas. On a rainy day late in October, Judd drove his chuckwagon into New Mexico on a dim wagon road just east of Portales. A few days later he was standing on the banks of the Pecos, with the blue-hazed mountains in the distance and the grasslands rolling into the horizon. "George," he said, "this is the best damn sheep country in the whole world."

During the long, golden days of autumn, Judd and Foster herded the sheep toward the mountains, grazing them on grama and buffalo grass. One day from a rise they saw the sprawling outline of Roswell in the valley. "I'd better go get some grub and clothes," Judd told his friend. "Winter is coming on. I'll have to get credit somewhere." He had a few loose coins in his pocket, but he felt no doubt about the credit. After all, he had a big herd of sheep. The mortgage on them was less than a dollar a head. Certainly he could get credit.

This is the long, fine wool from the Border Leicester breed. There is a good deal of imported blood in this breed, which Judd developed. His breeding program for better quality wool has been sound and practical. These are his hands.

Soaking wet, Judd would have weighed less than eighty pounds. He was lean and he looked hungry; his clothes were patched and months on the trail hadn't helped their appearance. He looked like a poor risk as he tied his team to the rack in front of Joyce-Pruitt and Company—General Merchandise. Hipshot cow ponies were tied in front of the saloons; cowboys whooped and spurred through town; Mexicans loafed in the shade of cottonwoods. He hadn't seen so many people for a long time. Roswell was a thriving town of 1500 souls in 1901.

Judd walked into the Pruitt store. A solemn man walked up to him.

"I'm looking for the boss," Judd announced.

"I'm Abe Pruitt," the man said gloomily.

"I want some credit," Judd said. "I have some sheep. I'll pay it back when we shear next spring."

Abe Pruitt's back stiffened. "You know it's boys like you that are ruining this country." He swept his hand toward the street. Walking past was a boy about Judd's age. "That boy owes me twenty dollars," Pruitt said. "He'll work on some cow outfit until he draws his wages and then he'll pull out without paying me. I'm not going to lose another dime by crediting you boys."

Judd shifted his attack. "But you don't understand. I've got some sheep up north of here. I've got to have salt and flour and stuff." He looked down at his ragged jeans and boots. He started to say he needed some clothes but his pride got the better of him. Pruitt said, "I'm sorry," and walked away.

Judd stared at the floor. He felt numb. He thought of the long trail drive, of bitter water and poor grass and small farms back in Oklahoma. Almost fiercely he turned to Abe Pruitt and said, "I won't take no for an answer. I won't cheat you."

Pruitt said nothing. All day long Judd dogged his footsteps. He did not leave the store. Every time Pruitt looked up he met Judd's determined eyes. Toward evening Pruitt said, "Come and meet my partner, young man." He introduced him to his partner, Joyce, and called to a clerk, "Give this boy all he wants."

Judd and his banker. Judd's ability to get credit, reflecting his honesty and reliability, has brought him through depressions and drouth.

Workers on the McKnight ranches are mostly Mexicans. They are handy with sheep and Judd gets along well with them.

Judd wasted no time in piling salt, flour, bacon, beans, dried fruit, socks, and a coat on the counter. Pruitt walked up and said, "That's not enough. Get whatever you want."

Judd doubled the order. The bill totaled $17.60. He put the supplies in the wagon and drove back to camp. When he got there he realized he didn't really know if he had $17.60 worth of supplies or not. He put the items near his campfire and gathered up a bucketful of rocks. Small ones for nickels, bigger ones for dimes, for quarters, half dollars, dollars. One by one he put each item in a line and placed beside it enough stones to represent its cost. When he finished he had counted out $17.60 worth of rocks. Abe Pruitt was honest. He would give his business to Abe.

A few days later Judd met Hubert Blackwell and together they started driving their sheep south. On December 31, 1901, Judd and Blackwell camped about a mile apart south of Hope, New Mexico. But Judd went to bed under the weight of a growing worry. He still had not slept by midnight. He got up, dressed, went to Blackwell's camp. He roused Blackwell. "I'm not going to the Big Bend country," he said.

Blackwell shook the sleep from his head and squirmed out of his bedroll. "What?" he cried incredulously. "Why not?"

"My sheep are mortgaged," Judd said. "If I sell them, I'll have to send most of the money back to my old man. I'll be out of the sheep business and I'll never have enough money to get back in. I'm going back north to Roswell. I'm going to homestead me a place when I get old enough." Judd's dream had a sharper point now—he knew what he wanted, and how he would get it.

He headed back to camp, his jaw set. When daylight came he turned his herd north. The sheep pointed out, grazing and unconcerned.

Spring came; Judd sheared his sheep and paid his debts. He wrote his first letter . . . to his father. Then he wrote to Nannie Potts. He told her of the opportunity in New Mexico, of the grass that grew in the mountains even when the plains twenty or thirty miles away were brown and sear. His letter to his father must have been persuasive, for that summer of 1902 Tom McKnight moved his family to New Mexico. The sheep partnership was resumed, but now Judd was the manager.

The next two years were good ones. Their herd increased; they traded, sold wool and wether lambs, bought more sheep. In the fall of 1903 when Judd was 21, he homesteaded a place about halfway between Roswell and Mesa. He built a one-room shack and his father, stepmother, and brother moved in with him.

Judd reached out, never satisfied. They ran their sheep on free range but they were in debt over their heads. Then an outbreak of scab gave them their first break. Judd was learning that the man who holds on when the pinch comes reaps the harvest of the weak who fall out. A government sheep inspector suggested that Judd build a dipping vat. He could make thousands of dollars, the inspector hinted. Judd followed his advice and he and his father and brother dipped 116,000 sheep at five cents each. Elated, they paid some debts, bought more sheep.

Here Judd decided that he would go alone. His family lacked his vision, and held him back. He sold the homestead to his father and brother, divided up the sheep, and moved out.

He dreamed of a mountain ranch where there was always grass and water. Herding more than two thousand sheep before him, he set out to find the sheepman's Shangri-La.

It was a two-year search. He ranged his sheep all through the White Moun-

An old Mexican shearing sheep. Note the body support harness, hung from the ceiling.

Mouthing or "toothing" sheep in the corral. Teeth condition shows animal's age.

is is the working team which operates the Knight sheep empire. In the foreground are d and Mrs. McKnight, "Granny." Back . left to right, are Judd, Jr. and his wife ; d, Sr.'s daughter, Joyce, and her husband, n Cooper ; Joe McKnight and his wife ; d's oldest daughter, Minnie, and her band, Clyde Marley. Wade, the youngest . lost his life in the war. Every sheep on the ch goes through the dipping tank low) at roundup time.

tains and got to know every waterhole and canyon in them. During the long days he had much time to think and plan. He composed a letter to Nannie Potts back in Quanah, Texas, hoping that she would be able to read it. Judd's prose was halting and he couldn't spell, but Nannie got the message. One day Judd left his sheep in charge of a Mexican herder and struck out horseback for Davilla, Texas. When he came back to the mountains in the spring of 1908, he brought Nannie with him.

He had a good start in sheep and a partner. Now to get the land.

In the fall of 1908 he and Nannie were herding sheep near the Pajarita Mountain, south of El Capitan, when he met a French sheepherder, Capt. Charles DeBremond. They were sitting around the campfire one night when Judd said, "I've got to find a place, but I don't know where there is water. Where would be a good place to homestead?"

"Do you remember an old pine tree at the head of Mountain Canyon?" DeBremond asked.

Judd nodded.

"You back off from the pine tree on a level spot and drill a well," DeBremond told him. "You'll find water and you'll never go broke."

The well came in at 715 feet. Judd rode into Roswell and signed his homestead papers; the Home Ranch was born. Judd and Nannie picked out a site on the slope above the well and built a dug-out. They covered it with boards and piled dirt on top and lived there three years. But it was uncomfortable and damp and Nannie preferred to stay in the sheep camps with Judd. Finally they built a small house of concrete and abandoned the dug-out. Judd kept reaching out . . . buying land . . . sheep . . trading. In 1912 he was running 14,000 ewes.

That same year a young Mexican, Antonio Gallegas, went to work for Judd. He became Judd's confidant and first lieutenant. Rather than feed mutton to the thirty men working for him, Judd and Antonio hunted the big mule deer that ranged the mountains and the antelope that foraged on the plains to the east. A haunch of venison was always worth a

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By Grant Cannon

VERTICAL INTEGRATION

J. D. Jewell, of Gainesville, Georgia, king of the poultry integrators.

Vertical integration has become a national issue. It has taken over broilers and is now moving hungrily into many other farm enterprises.

IN GEORGIA there is a man who hatches, feeds, raises, kills, plucks, freezes, and sells 10 million chickens a year. He also owns the hens that lay the eggs that hatch into the broiler chicks; and he makes the pies that contain the chicken meat that isn't sold as frozen broiler. His name is Jesse Jewell, and his operation is just about the perfect example of what may be the agriculture of the future.

The revolutionary economic organization that propelled Jewell from a small-town feed dealer to the largest integrated producer of broilers in the country is called vertical integration. Some hail it as a long needed reorganization of farm economics that will bring greater efficiency to agriculture; others see it as the slimy tentacles of a tyranny that is changing the American farmer into an employee—a piece rate worker. Nearly everyone who has studied the dynamic growth of integration agrees that as this system, which now dominates the broiler industry, is applied to hogs and cattle and other farm enterprises it is bringing about the greatest change in American agriculture in a generation. It is changing the relationship of the farmer to production and to marketing.

Since vertical integration is still in the development stage in agriculture and has taken many forms, it is a little hard to define. In a general sense, it is a regrouping of resources, either through ownership or credit control, in order to carry out different levels of activity in an enterprise. Jesse Jewell is a classic example of integration in agriculture. An industrial example would be a steel company which adds iron and coal mines to provide raw materials, a steamship line and a railroad to furnish transportation, and a fabricating company to convert the steel into useable forms and to sell it to the ultimate consumer.

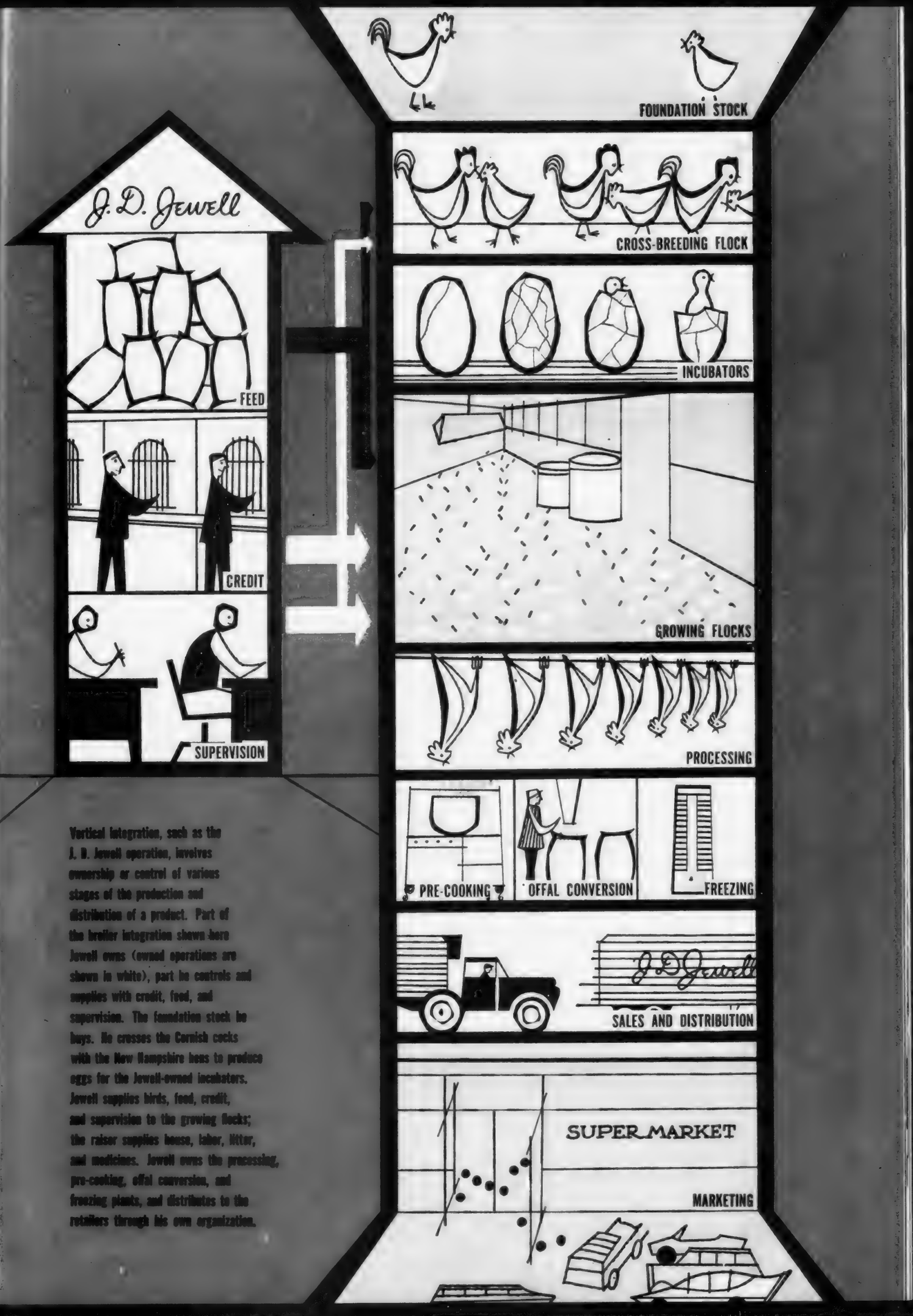
There was a time, of course, when all agricultural activity was integrated. That was when the farmer produced everything he used—he made his plow from wood, built his harrow by driving pegs into an A frame, produced and saved his own seed, raised and fed his own horsepower, cobbled and wove shoes and clothes, and did without 'most everything else. And he also processed and distributed the produce that got off the farm—he skimmed the milk and made butter, smoked hams, jerked beef, dried fruits, and stored many of the vegetables in pits for winter delivery. Those were the days when the word cash had little meaning in agriculture; and it took ten farmers to feed one city man.

In the years that followed, as society became more complex, a division of labor was introduced into agriculture and farming shifted from a subsistence to a cash basis. The equipment and supplies that farmers need to raise their crops were taken over and produced for them by industry for cash and between the farmer and the consumer a great processing and distributing enterprise grew.

With the coming of integration some feel that we have come full circle and are again uniting the functions of supply, production, marketing, and distribution into a unified enterprise. From another point of view, others feel that integration marks the final triumph of capital over the other two traditional elements of production—land and labor.

Jewell Becomes an Operator

The use of capital was certainly the main reason for the start and the growth of the Jesse Jewell integration in north Georgia. When Jewell started his operation in 1936, the small farmers who tried to make a living raising cotton in the red earth around Gainesville knew the meaning of the words capital and credit, but those who had any of either were about as scarce as independent broiler raisers are today. During this black period, Jewell took over the operation of a feed dealership owned by his mother. He found that to sell feed, he had to help farmers get livestock to eat it so he began by using the slim credit of his business to finance chicks for his customers. Then, in order to collect the feed bill, he found that he had to help the farmers sell the broilers they had raised. He would pile the caged broilers onto a truck and drive all night to Florida where he could get a better price for them on the live market.



Vertical integration, such as the J. D. Jewell operation, involves ownership or control of various stages of the production and distribution of a product. Part of the broiler integration shown here Jewell owns (owned operations are shown in white), part he controls and supplies with credit, feed, and supervision. The foundation stock he buys. He crosses the Cornish cocks with the New Hampshire hens to produce eggs for the Jewell-owned incubators. Jewell supplies birds, feed, credit, and supervision to the growing flocks; the raiser supplies house, labor, litter, and medicines. Jewell owns the processing, pre-cooking, offal conversion, and freezing plants, and distributes to the retailers through his own organization.

Sows and boars are leased from the feed company and paid for in kind after farrowing, in the swine integration arrangement that is in the development stages. The company supplies feed, credit, and supervision. Inbred lines, suitable for rotational breeding, are used.

That was the start of big broiler raising in Georgia. "In those days," Jewell recalls, "fifty thousand bales of cotton were sold right here on this street and farmers were in debt for fertilizer and food from one crop to the next. Now there isn't a cotton gin within thirty miles of here, cotton has taken second place to broilers as the biggest Georgia crop, and this area has changed from one of the sorriest in the country economically to a rural area with a very high per capita income." Jewell's beginning effort was also the start of integration.

As his business grew he reached a point where he resented sending so much money out of the state for baby chicks — so, he bought an incubator and started hatching the chicks his farmers needed. He also felt that most of the profit was getting away when they shipped and sold on the live market—so, he started a processing operation and began selling iced broilers. These moves set the pattern; since then he has been fighting for greater economy in the operation and aggressively searching out new areas for expansion.

Today, J. D. Jewell, Inc., owns the breeding flocks that produce the eggs from which broilers are hatched; they own the incubators that hatch the eggs; they contract with the producers to raise the birds to broiler weight; they own the feed mill that produces the feed; they employ the supervisors who see to it that the broilers are raised properly; they own the processing plants that kill, pluck, eviscerate, and freeze the broilers; they run a pre-cook unit that cooks, breads, and freezes just-warm-and-serve broilers; they operate a pie plant that makes chicken pies for freezing; and they own a by-product plant that takes the heads, feet, eviscera, and feathers and converts them into meat scrap meal, feather meal, and fat that goes right back into the Jewell feed, and then back into the Jewell chickens.

The processing plant has grown from a team of five women sitting around a wash-tub full of hot water plucking chickens by hand, to a modern plant on the edge of town that employs over 300 workers.

The feed operation started as a dealership and grew to the point where Jewell himself became the largest individual customer for broiler feeds in America. At this point, Jewell decided to build and operate his own feed mill. He altered these plans, however, when Pillsbury Mills, with whom he had always had friendly relations, convinced him that the operation of a feed mill was a highly specialized business and suggested a joint enterprise. The result was that Jewell built a $300,000, nine-story mill and warehouse which he leases to Pillsbury. They supply him with feed and he gets a royalty on the feed they produce for other growers.

The by-products division came into being when Jewell realized that with his tremendous growth there wasn't a river wide enough or a hole deep enough to take care of the refuse that the new poultry industry was creating—and beside that he hated to see a potential profit go to waste. He started by converting the offal into fertilizer. Then, he installed a giant cooker to change the heads, legs, and guts into meat scraps for chicken feed. When nutritionists found that feathers, too, could be processed into a high-protein feed almost as nutritious as dried blood, Jewell adapted the process to his rendering plant. Today, he has 12 cookers, with 3 more on order, which process the refuse from six million north Georgia broilers a week.

When his competitors, and he has many of them, began getting a foot in the door with some of his best customers by offering chicken pies and then following up with their own broilers, Jewell responded by merging with a frozen pie company which now operates as a division of J. D. Jewell, Inc. His own chicken pie is now on the market along with a complete line of frozen fruit pies. He is also experimenting with canning the shredded meat from necks and wings which can be used as chicken barbecue or the basic ingredient for salads and sandwiches. In his spare moments, which are few, he leans back in his big leather chair in the pine panelled office over the hatchery and dreams of re-

placing the hot dog as a national snack with a delicious chicken popover.

The feed mill, pie plant and other divisions are the extensions of integration from the major enterprise which is the production of a uniform, high-quality broiler, raised on Jewell feed. This was the first and remains the most important function of the whole structure. To insure uniformity and provide the best possible birds, Jewell imports from other parts of the country the pullets and cockerels that go into his breeding flocks. From eggs laid by New Hampshire Reds crossed with White Cornish cocks he hatches the chicks that are sent out to his producers.

Labor for Lease

From egg to broiler the birds are the property of Jewell and so is the feed that goes into the chicken. "In effect," Jewell explains, "we lease the buildings, equipment, litter, medicines, and labor of the producer. They all work under a uniform contract that hasn't been changed for the past six years." Under this contract, the producer agrees to furnish the poultry house, the brooders and fuel for them, the feeding and watering equipment, the litter and medicines that are needed and raise the birds according to Jewell's direction. Jewell furnishes the chicks—the average batch is 5,000—supplies feed in bulk tanks, and sends a service man around once a week to help with any problems. Between 9 and 14 weeks, the broilers are picked up and shipped to the processing plant where they are weighed and are graded by U. S. Department of Agriculture graders.

Payment is made to the producer on the basis of weight, feed conversion, and the going market price for live broilers as quoted by the Department of Agriculture. On the back of each contract is a schedule showing the average weight of the broilers, the many possible feed conversion ratios, and the price that will be paid per pound when the market price is 25 cents a pound. For example, a three-pound broiler with a feed conversion of 2.7 pounds of feed for each pound of meat will bring $0.0631 a pound; if the conversion rate drops to three pounds of feed for each pound of broiler, the price goes down to $0.0481. For each cent above 25 cents that the price rises on the live market, the price paid to the producer goes up ½ cent until the live market price reaches 30 cents, which is the upper limit shared by the producer. As the price goes down below 25 cents the contract price is dropped ½ cent for each cent drop until the price reaches 18 cents which is the lower limit that the producer risks. These prices are all based on Grade A chickens. Grade B birds bring two-thirds of this price and Grade C birds only half the price.

Jewell is one of hundreds of feed dealers, hatchery operators, processing plant owners or combinations of these groups who have developed integrated units. The size and extent of integration of his operation—which has won him the title of Nation's Cackle King—is unusual, but the vertical integration that he pioneered now accounts for 90 per cent of the broilers raised in the United States. Contracts with producers vary widely, but basically they provide credit for the operation, reduce the risk of raising broilers, and furnish an outlet to the market for the producer. This last factor is so important that an economist who has made a study of the Georgia broiler industry said, "I seriously doubt if an independent farmer could survive in the broiler business. Even if he could finance the whole operation and take advantage of the cash discounts that are offered, he would still have to be part of an integrated enterprise to get his broilers on the market."

The effect of integration on the small farmer who shifted from a cotton patch to a broiler house during the past 20 years has been revolutionary. Jewell's own comment is, "Farming is going out of style around here. The biggest part of the producers have jobs in town—the feed mills and processing plants and trucking jobs employ twelve thousand right here in Gainesville—raising broilers is a side line they do in their spare time for extra income. Most of the work is done by the women; the husbands do the heavy jobs of cleaning out after a batch and repairing the houses."

Most of the producers own their own homes and poultry houses, but previous experience in broiler raising is not considered essential. With Jewell selecting the chickens and the feed and supervising the operation, anyone who will conscientiously follow directions can do the job. As one producer said, "I think Mr. Hastings who visits us could take a man who had never seen a chicken and make a good broiler man out of him."

This does not mean that good producers are taken for granted. They are the key to a constant flow of broilers into the processing plant that keeps the whole enterprise going. Jewell's contract is specifically designed to reward the producer who does a good job as shown by a favorable feed conversion rate. In addition, he gives a prize each month to the producer among the 500 who contract with him who has done the best job. On the other side of the picture, the Grower's Exchange, an organization of integration operators, maintains a black list with the names of producers who are considered unreliable or inefficient. Once a man gets his name on this list he is through as a broiler producer, for no feed dealer will place chickens with him.

The result of integration has been to create a group of broiler raisers who don't give a hang about the cost of chicks, since they never buy any; who don't care what feed costs, since it is sent them as part of the deal; and who don't even pay any par-

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Men and equipment are leased by the feed company in the integrated poultry industry. Many contracts guarantee the raiser against loss and pay him on the basis of feed conversion. Under integration the production of broilers in the U.S. has more than doubled since 1950.

Rain Isn't Enough

Crop yields and soil moisture tests show that we need more water and need it oftener than rain will provide. Even in the best of years, there's need for irrigation

An electric moisture tester (right) tells the farmer when he needs to irrigate. Hot, dry winds will steal the moisture even when rains are frequent.

"I DOUBT if I'll ever see a better corn year than 1956," said Tom Pottenger, who raises sweet corn in the valley of the Great Miami River in Ohio. "It rained just about like you'd order it if you were planning a perfect year, yet we irrigated three different times and we figure irrigation gave us a five to ten per cent increase in our gross."

If, during the best year within the memory of this man, corn profited from irrigation, it is not surprising to find that the equipment was valuable every year. The extent to which it was of value, however, *is* surprising.

Pottenger bought his equipment, $7,000 worth of it, in the early spring of 1954 and had it set up before he started his early planting. With sweet corn, the Pottengers try for the earliest possible market by planting in early April and continue planting into July and harvesting until late in September or early October. 1954 was not a good year as far as rain was concerned. "That year," Pottenger said, "we had our most dramatic example of what a system could do. We planted the forty-five-acre piece next to the river in early corn and we irrigated it one and a half times before we got rain. We boosted the yield we had been getting in good years and stepped up the date of maturity by five or six days. That year the early price of sweet corn was great—it went as high as eighty cents and held at fifty to sixty cents a dozen for three weeks. Irrigation helped us hit this market in full strength. We figured we grossed fifteen thousand dollars that year which was directly credited to irrigation, or over twice what the system cost us.

"In 1953, which was also a bad year for moisture, we planted the high field on July first. We had no rain to speak of and we harvested a hundred and fifty dozens of poor-quality corn to the acre. In 1954 we planted the same field at almost the same time of year; we irrigated three times and got thirteen hundred dozens to the acre, which is higher than we ever hoped to get, even with irrigation."

That is the kind of story that has always sold the farmer on irrigation. While years like 1956 convince him that he can make it without irrigating, Pottenger found this was not true. The summer of 1957 was far better than average and should make a good test. "We had over eighteen inches of rain between April 15 and September 15 in 1957, which is about an inch more than we usually get during that period," Pottenger said. "And we started with the ground so wet that we had to delay planting until April 15. We had 6.2 inches in May, but we had to irrigate early in May to get the corn up because the rain wasn't spaced right. In June we had a cool month and five inches of rain spread out in seven nice showers and we didn't have to irrigate In July we had 4.2 inches, about evenly divided between the first and the last of the month, and we irrigated for a week solid in the middle. In August we had 1.8 inches on the eleventh. That was all. We irrigated once and were going over it again when the rain caught us early in September.

"This was a good year," Pottenger continued, "yet we were irrigating three different times. On one of our sandy fields, we know that without irrigation—even in this good year—we would have had a total loss. With irrigation we got yields as high as 1300 dozen to the acre, which is about like getting 130 bushels of field corn to the acre. We also had some irrigated sweet corn that followed field corn where our yields were down to 600 dozen Over all, we figure that irrigation gave us an increase of 15 to 20 per cent on this good year. With that kind of return I have increased my investment in irrigating equipment every year since we bought the system. We have extended the use of the equipment to save our cover crops after they have gotten a start and then been left stranded by a drouthy period. Right now we are considering changing the system to a high-pressure system for use on the sandy soils and keeping the low-pressure system for use on our heavier land."

Sweet corn is a high-value crop and a farmer can afford to spend more raising it than he would want to lay out for a weedy pasture. The crops on which irrigation pays and those on which it doesn't have to be sorted out for every location. In the arid west every crop that is grown must be irrigated—except for dry-land wheat and that, too, would be irrigated if

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The Screech Owl

who-o-o is the farmer's best friend

THIS is a common screech owl doing what he likes to do best—eating a mouse. A screech owl around the farm is better than any cat, and he'll catch fully as many mice and you won't have to pamper him and feed him during the off season. The screech owl comes in two color combinations, red and brown, and gray and black, the two phases are often found in the same brood. He nests in a hollow tree or nook of a building. Usually he spends a minimum of time building a nest, scratching together a few twigs and leaves. His wife lays three to five eggs and as soon as the young are hatched the parents start them on insects and worms and work up to mice, frogs and an occasional fish. A bird of the night, the screech owl flits on silent wings like a shadow along the ground, pouncing on frogs and mice in the grass. His feathers are soft and fluffy—pluck him and he's no bigger than a robin. He's the only small owl with ear tufts. His big, round eyes, very good for seeing at night, are fixed in his head but he has a very limber neck. His cry is a mournful, tremulous wail, running down the scale, and sounds very much like a coloratura gargling in high C. With this he scares the daylights out of folks who are passing graveyards at night. The screech owl is with you the year 'round and doesn't wander very far from the place of his birth. Like his big cousin, the barn owl, which incidentally will catch as many mice in one night as twelve cats, he deserves all the protection he can get as one of nature's balances.

Going, going, gone—three steps in the conversion of mouse into owl. The mouse is measured for size (above), turned to go in head first. There may be trouble here (right), a slight misjudgment perhaps; but victory at last (far right) and quite proud he is. Larger morsels are held in the talons and torn apart; this is a handy arrangement when feeding the young.

from The Saturday Review

"Psst—Pepe—everything's been fixed—the bull's on tranquilizers"

Now it's Tranquilizers

They calm the unruly and put faster gains on cattle and sheep

SOONER OR LATER some inquisitive experimenter was bound to try out the new tranquilizers on livestock. It doesn't take a mental giant to reason that if the energy used up by a steer in walking around could be used in building meat, he wouldn't eat so much and it wouldn't take him so long to reach market weight. This was the theory behind caged layers. If a bunch of steers, or hogs, or a flock of broilers could be calmed down to the point where they just didn't give a darn about anything but the feed trough, they ought to lay around and put on weight like Aunt Emma with a banana split.

It was tried, but the results were not quite what was expected. It was found that tranquilizers given to hogs and hens in sedation doses changed their entire personalities; mean old sows could be converted to parlor pets and leghorns persuaded to keep their feet on the ground, but they gained no more weight than in their previous untranquilized condition. The chickens actually seemed to eat less and, consequently, to gain less.

But with cattle and sheep it was different. Just a speck of the tranquilizer drug added to their feed, a mere 5 grams to a ton of supplement, not nearly enough to have any sedation effect whatsoever, and they immediately shifted into high gear on feed conversion. Why, nobody knows. The point is that ruminants seem to be able to use the drug in some way that nonruminants do not. The results point to new guarantees of economy in feeding.

No one claims to know exactly how tranquilizers work. They have come into use in American medicine only within the last three years and in that time have become one of the leading items in the drug trade. A dozen or more of them are now on the market sporting such names as Atarax, Miltown, Equanil, Thorazine, Raudixin, Paxital, and Serpasil. Their precursors have been known to the primitive witch doctors and medicine men for centuries. Dr. Louis G. Nickell, plant physiologist at Chas. Pfizer and Co., reports that Rauwolfia, the plant from which reserpine and other tranquilizers are derived, has been used in India for 3000 years for fevers and snakebite. The Hindus used it in the treatment of insanity and as a sedative, and there are indications that Ghandi resorted to it to sustain him in his campaigns of passive resistance.

Back ten years ago, medical men began efforts to isolate the active ingredient from the rauwolfia root and in 1952 a CIBA research team finally extracted the crystals of the drug reserpine, the active ingredient in Serpasil. This substance was used at first as a remedy for high blood pressure; then it was found that it did a remarkable job of reducing anxiety in patients. Dr. Alfred E. Earl, in charge of experimental animals at CIBA, tried a dose of reserpine on a wildly agitated bunch of monkeys that had just been received at the laboratory and was amazed at the way the animals calmed down while remaining fully coordinated. It was next tried on a group of mental patients with favorable results.

In the meantime such other drugs as chlorpromazine (the active ingredient in Thorazine) and meprobamate (from which Equanil and Miltown are derived) were also attracting attention. Their claims were sustained and the tranquilizer boom was on.

Then a few veterinarians began experimenting with the tranquilizers, mainly with small animals, dogs, particularly, and cats. In this field they are known as "chemical restraining agents." Veterinarians use them to sooth the anxiety of the dog left at the boarding kennel, as a preanesthetic for a dangerous dog about to undergo surgery, to quiet the dog brought in to have his toes trimmed or his tail docked.

More recently they have been used to calm sheep while being sheared and their use has been suggested to quiet animals in shipment, to calm sows at farrowing time, and to quiet stallions and bulls so they can be handled in greater safety. And there has been talk of administering tranquilizers to cattle before slaughter in the hopes of eliminating "dark cutting" beef. The theory here is that excitement in the animal triggers the release of adrenalin which

burns up much of the sugar in the system, causing the dark colored meat. Anything that will calm these animals before slaughter, it is argued, should aid in eliminating the objectionable color. But at the University of Missouri, where a process has been developed by which dark cutting beef can be produced at will, they say that so far the tranquilizers they have used have been ineffective.

Nor have other uses mentioned in large animal practice yet been approved. When asked what the side effects or after effects of these uses may be, veterinarians and pharmaceutical houses frankly admit they do not know. As a research veterinarian with one of the big drug firms said recently, "Tranquilizers are in the experimental stage and their use is being confined to experimental animals. While they probably would have no deleterious effect upon a gilt or sow if given before farrowing, we do not know for sure. We are not going to advise their use with high-priced breeding stock until we *are* sure."

There is nothing to stop veterinarians or livestock owners from using the pills if they think the occasion justifies the action. Nothing but the cost, that is. A 500-milligram pill which would be sufficient to calm a 100-pound dog for a few hours costs about 12 cents. Proportionately, it would cost around $1.80 to dose a 1500-pound bull. To keep him under the influence for any extended period would get a bit expensive. There are more potent tranquilizers which will do the job on a smaller dose, but the cost will not be materially less. Actually, no one is sure what the proper dosage should be. In work with chickens at the University of California it was found that the birds need a much heavier dose, based upon body weight, than do humans. This was in an experiment to determine the effectiveness of tranquilizers in affording protection against high temperatures in the hen house. Here the drugs were effective. Birds treated with reserpine suffered only a 3 per cent mortality against 50 per cent in the controls; chlorpromazine-treated chickens had a 15 per cent mortality against 50 per cent in the controls, when the temperature was raised as high as 113 degrees Fahrenheit. But, oddy enough, the amount of protection provided by reserpine depended upon the strength of the dose, whereas a small amount of chlorpromazine was as effective as a large dose, if effective at all. The chlorpromazine had no beneficial effect on young chickens and it had no soothing effect on older birds.

In the Feedlot

It is as a growth stimulant in ruminant feeding that the tranquilizers show most promise. Working at their extensive animal research center at Terre Haute, Indiana, the Pfizer people have come up with results in cattle and lamb feeding which Dr. Herbert G. Luther, Director of the center, describes as "a real break-through" in the field of animal nutrition. No detailed figures have been released on the feed trials but lambs improved their feed efficiency as much as 20 per cent when minute amounts of tranquilizing drugs were introduced into their feed, and they put on weight much faster. With some of them the time to reach a desired finish was cut 25 per cent or more.

Cattle, in several trials ranging up to 168 days, showed an improvement of 5 to 20 per cent in feed efficiency. It is hardly possible to pinpoint the results of the Pfizer trials for the layman since various tranquilizing agents were used and at varying levels; also, they were used in some cases as the only additive to the feed and in others in combination with Terramycin, with stilbestrol, and with combinations of Terramycin and stilbestrol, with which combination, incidentally, they gave the best results. But the figures seem to hold a lot of promise. For example, Hereford yearling steers gained an average of 2.13 pounds a day during a 168-day period with none of the additives in their feed. When Terramycin, stilbestrol and tranquilizers were added, the tranquilizers at very low levels—about 5 grams to a ton of supplement—gains jumped to 2.51 pounds per day, up 18 per cent. And whereas it took 10.96 pounds of feed to make a pound of gain in the control group, those on the fortified feed made a pound of gain on 9.69 pounds of feed, up 13 per cent in feed efficiency.

In a 110-day trial in which all the steers had stilbestrol and Terramycin added to their feed, the controls gained 2.88 pounds per day while those which received a dose of tranquilizer in addition to the hormone and the antibiotic put on 3.25 pounds per day and made a pound of gain on only 8.24 pounds of feed as contrasted to the 8.57 pounds of feed required by the controls. This was an increase of 13 per cent in daily gains and 4 per cent in feed efficiency.

Another point in favor of the tranquilizers is that they have no bad effect on carcass grade. The hormone additives have sometimes caused a drop in carcass grade. In the last experiment mentioned the control steers graded in the high-good bracket; the tranquilizer treated animals were well within the choice classification.

Cattle seem to have a great tolerance to the tranquilizers when given at the levels used in the feed trials. Apparently a steer can easily be given twice as much of the drug as might eventually be recommended as a feed additive without suffering any ill effects. In the Pfizer experiments as much as 400 times the size of the low level dosage was given without harm.

Why?

The only thing the research workers seem to know for sure about why the tranquilizers work as they do with cattle and lambs is that it is not because of any sedation effect. They have watched their

(*Continued on page* 85)

Cattle have shown remarkable feed gains with low levels of tranquilizers. A larger dose would have made it easier to move this steer (below) at Cincinnati's Swifton Shopping Center.

TOOL WITH A 100 USES

THE VERSATILE FARM SPRAYER

By Fred Knoop

A Myers high-velocity air sprayer at work in a vegetable field

BUYING A SPRAYER is one time when the farmer should put the cart before the horse. There are three questions that he should ask himself before he decides on any one of the couple of dozen makes and types of sprayers on the market today. What am I going to spray? How much acreage do I have to spray? How often do I have to spray? The man who is going to handle 200 acres of cotton may want a high-speed high-boy type of self-propelled sprayer that can handle the 15 to 18 spray applications that it takes to keep weeds and insects under control from the time the plant is a seedling until it is ready to defoliate at 7 or 8 feet tall. The corn farmer who wants to handle pre-emergence sprays, corn borer spray, then work in the pasture in fall with liquid fertilizer may settle for a trailer sprayer with a steel or coated tank and stainless steel nozzles.

Raising these two crops, cotton and corn, puts the sprayer to work on many of its basic jobs: weed control, insect control, pre-emergence weed control, defoliating, and applying liquid fertilizer. But there are many other uses for the sprayer. With the accessories that are available today, a sprayer is usable just about every week in the year. Farmers are using their sprayers for killing brush, applying fly and grub control chemicals to livestock, spraying barns and animal shelters with fly control chemicals, painting barns, spraying lanes and barnyards with oil, cleaning tractors, spraying pastures to control insects, introducing fertilizer into irrigation lines, producing a fog to fight fires, and even digging post holes with a stream of water.

Basically, a spraying outfit consists of a pump, a tank, a pressure regulator, and hose for moving the spray material from the tank to pump, to regulator, to the nozzle. Using a pump and hose kit, an old 55-gallon drum and some scrap iron for attaching the equipment to the tractor, it is possible to put together a workable spray outfit for under $100. But dollar for dollar the spraying rigs that are designed by experts and sold for doing the basic farm spraying jobs are the best buys in the farm equipment market today. There is little reason to spend time chasing down all the small parts needed for building sprayers, that is, unless you have time to spare. Most farmers don't!

The Pump

The pump is the heart of any spraying system. It puts the liquid where you want it and with the pressure you need to do the job. When you talk pumps you'll find there are six kinds, basically, with variations introduced into each by individual manufacturers. These are piston, diaphragm, gear, centrifugal, vane and nylon roller pumps. You soon discover when you consider pumps that you run head on into the big split in the sprayer field. There are the high-pressure sprayers and low-pressure sprayers; the difference between the two types begins with the pump.

High Pressure Systems

High pressure pumps, with a range of operating pressure from zero to 800 pounds, are more complicated in construction and usually cost more because they must be heavier and sturdier. To develop this kind of pressure, you need a piston-type pump connected to a power source that is relatively slow-moving in terms of r.p.m's. Often, because of the large amount of power needed, a high pressure pump has its own power unit.

A high pressure sprayer system will do any kind of a spraying job. It is a must if the job to be done is fogging truck crops or covering fruit trees with sprays to control insects. It has an additional value in fighting fires with the fogging method, which was developed during the last year. It blows out, it cools, and it smothers, and it wets down any burning material. When the sprayer isn't in use in the field, it can be kept full of water, gassed up and ready to hook onto. For fighting building fires, grass fires, electrical, gasoline, and oil fires it will let you sleep more soundly than depending on a volunteer fire department 10 miles away. The blast of the watery fog blows out a Class A (wood or inflammable material) fire like you blow out a match. On Class B fires (liquids), the millions of water droplets in the high-pressure fog turn into steam, absorbing heat in the process,

reducing the temperature below the combustion point. Then, too, the expanding steam replaces and shoves out the oxygen, the most important ingredient of any fire. The remaining water wets down and cools off the whole area. One hundred gallons of water under 400-600 pounds pressure is as effective for fire fighting as 1000 gallons from a hose.

For pumping viscous materials, such as spraying molasses on poor quality hay, a piston pump must be used.

Probably the deciding point for the use of a piston pump for many farmers will be the fact that wettable powder spray materials, such as are used for vegetable and fruit tree spraying, will damage other types of pumps. The ceramic cylinder or honed steel lining in the finest piston pumps will withstand the corrosive and abrasive action of this kind of material.

Piston pumps can handle good volumes of liquids. This adapts them to use in spreading liquid fertilizer, where large gallonage is needed and the acreage is to be covered fast. The corrosive action of some types of liquid fertilizers will have little effect on the better piston pumps.

So, if you have big acreage and need a big, rugged sprayer for jobs that require high pressure at the nozzles, the piston pump may be your best buy. The prices start at about $700, which will include a mounted power unit and a 200 gallon tank mounted on wheels. Smaller units using piston pumps mounted on tractor take-offs will cost from $300 up.

Low Pressure Pumps

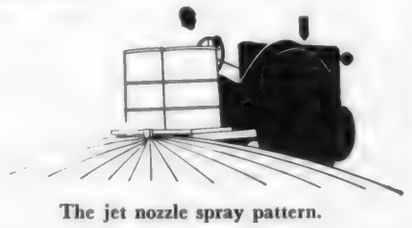
In the low pressure pump division are the diaphragm, gear, centrifugal, vane, and nylon roller pumps. The diaphragm pump develops very low pressure and is used mainly for pushing out liquid fertilizer and in helping gravity do its job. It does have good capacity, but is not adapted to creating enough pressure for most sprayer uses. When made of resistant metals it stands the effects of corrosive liquids quite well. It is often powered by a reciprocating arm attached to the sprayer wheels.

The centrifugal pump can be used to deliver large quantities of liquids to the distributing nozzles. It does not have the ability to deliver high pressure with its discharge. It is often used for large volume liquid fertilizer distribution from trucks and it makes possible fast travel over the field.

Over half of the farm sprayers are equipped with gear pumps, nylon roller and vane pumps. They do a good job under most farm spray uses. They are inexpensive and have made possible the low costs of tractor mounted and trailer type farm sprayers because they require low horsepower to drive them. Usually they are mounted on the tractor power take-off. From a mechanical design standpoint they are not capable of developing extremely high pressures. From zero to 200 pounds pressure is the normal working range, although some are capable of higher pressures. These small pumps will deliver from 2 to 20 gallons of liquid to the nozzles per minute, depending upon the pressure at which they are working. With the small nozzles used to create a mist for covering leaves of plants with insecticides, higher pressure will be needed with low gallonage. For liquid fertilizer larger gallonage and low pressure is used.

Jets, Booms, and Guns

The jet nozzle is the wide angle speed king. It spreads the spray out in a pattern that covers a swath up to 50 feet wide. It is fastened directly to the hose fitting and can give reasonably good herbacide or insecticide coverage on pastures or small grain at 10 miles an hour tractor speed. Because the jet is used as a single nozzle in back of the tractor, without a boom, or outrigger, it makes the cheapest spray outfit.



The jet nozzle spray pattern.

Nozzle cluster jets of 2, 3, and 5 jets clustered around an outlet fitting are also used to give greater gallonage.

While the jet is the cheap sprayer outlet, it does have limitations in row crops. In high winds it gives irregular coverage, which is bad if you are working on alfalfa bugs or grasshoppers. Some types of jet sprayers are fitted so that the holder can be removed and used as a handgun for spraying weeds, cattle, or applying fly spray to buildings.

Booms are the outriggers extending from the sprayer. They can be adjusted for height, and usually have a safety break-back feature if you hit a fence on a turn. They are folded for transport to and from the fields. There are two types of booms, the wet and dry booms. In the wet boom the nozzles are screwed directly into the pipe, which is both a support and a transport for the liquid. In the dry boom the pipe or square steel outrigger serves as a support for clamps which hold a hose strung underneath through which the spray material flows. The latter is the more expensive construction and has some advantages of strength and flexibility.

The complete spray pattern of the boom.

The wet booms are made from steel tubing, aluminum, or black iron pipe. Keep in mind that aluminum will handle nitrogen solutions, but complete liquid fer-

Proper application in tall cotton comes from parting the plants with the sprayer's sloping fenders, then shooting the spray in from below and above.

A front mounted sprayer boom gives high visibility to the operator and makes fence row work easy. The tank is behind the seat.

Top-dressing with liquid fertilizer is a high-speed operation and gives the young plants a good start in life.

The mule comes back to the cotton field in this John Blue-designed sprayer for use in tall cotton for boll worm and boll weevil control. The sprayer pump is powered by an air-cooled gasoline engine.

Here is some advanced thinking in liquid fertilizer spreaders. The Flolizer Company of Kingston, Ohio, adapted this Jeep cab-over-engine pick-up for speed spraying. The steel tank holding 500 gallons of complete tailor-mixed liquid fertilizer was built to fit flush into the truck body. Three Hanson Broadjet nozzles do the spreading from folding booms. The liquid is pumped by a Roper centrifugal pump, powered by power take-off. The tank has two eyes welded to it and can be lifted out and disconnected in 10 minutes, to make the Jeep usable for any farm job. With four-wheel drive the truck can do a spreading job even when the fields are wet, and there is little packing because of the low overall weight of the vehicle and its load.

tilizers require steel and stainless steel to resist the corrosive effects.

A boom gives the most accurate placement of spray material. With a boom sprayer, drops or extensions can be used to drop the nozzles down between rows, putting insecticides on the underside of the leaves. With cotton, particularly, the thorough method of application, on top, on the sides, and underneath, is the only method of getting a good boll weevil kill.

Booms can be set up for 4, 6, 8, or 10 rows. The average farmer will probably settle for a 6-row boom. This has a wing spread of about 21 feet and will cover about ten acres an hour, not counting refill time for the tank. This would allow for applying 5 to 100 gallons per acre.

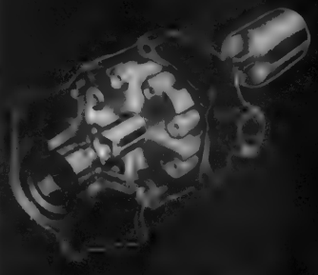
The gun-type of sprayer is used for hand work with a long length of hose, taking the spray material directly from the pressure regulator. A gun can be used for spraying cattle, applying fly spray on buildings, whitewashing, fence row brush spraying, cleaning equipment, fire extinguishing. Many orchard men still like to work with two guns, one on each side of the tractor as they go between the rows of trees. The height of the tree covered will depend on the pressure used. Usually with a gun you will want to use 150 pounds or more pressure. Guns are adjustable by turning the handle to produce a fine spray or a stream of liquid. Certainly a gun is a useful accessory for any sprayer and greatly widens the use of the sprayer through the year.

Tanks

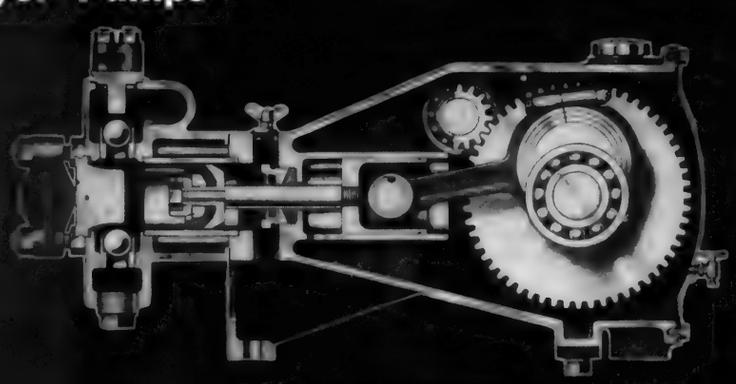
Most often used are the standard 55-gallon tanks made of steel. These are cheap; when they corrode they can be thrown away. Specially shaped tanks of just about any size can be obtained in steel, aluminum, or stainless steel. The latter two are expensive, but they resist the corrosive effect of some liquid fertilizers and spray material. For large acreage the big tanks save time going back to the spray supply for reloading. You can see that if you apply 10 gallons an acre and cover 10 acres an hour, a 100-gallon tank will make just an hour's run. Let your acreage determine the size of the tank. In hilly ground you may be limited in the size of the tank and the way you carry your spray material weight. You can figure that 100 gallons of spray material will weigh right at 850 pounds. A tank for hilly country should be mounted horizontally on a wide wheel-base trailer.

There are new developments in tanks to give them longer life with corrosive materials. One of these is the plastic lined steel tank. This is much cheaper than stainless steel and still has a long life span. Another long life guarantee is the use of high-carbon steel for the tanks, valves and fittings.

Two Types of Farm Sprayer Pumps



An 8-roller Hypro nylon pump. This type of pump is usually attached to the tractor power take-off. It is capable of building up 350 pounds pressure. At 400 r.p.m. it will deliver 8 gallons per minute at 50 pounds pressure.



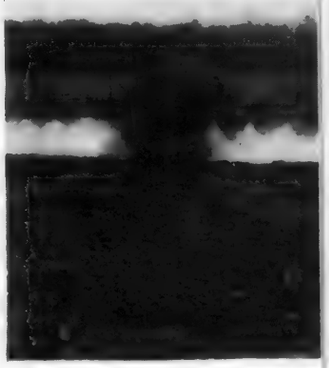
A Bean Royal cylinder pump. This type of pump has 3 cylinders and is driven by its own power unit. In the larger size it can deliver 60 gallons per minute at 800 pounds pressure at an r.p.m. of 150.

HOW TO MAKE YOUR SPRAYER WORK ALL YEAR

Just a few years ago the farmer bought a sprayer because he had some special need for it . . . like spraying fruit trees. Then came the low-cost tractor sprayer, and dozens of new uses were discovered. University of Missouri spray experts estimate that 75 per cent of Missouri farmers own sprayers and 90 per cent use them!

Right at the turn of the year is a good time to clean up hog and chicken equipment using high pressure spray and a disinfectant. Basal bark spraying to kill scrub trees should be done while trees are dormant.

You can be ready for fire-fighting any time of the year. The high pressure sprayer gives on-the-farm protection. Fall fertilizer applications are in order now. A final barn-spraying for fli[illegible] can eliminate millions of next spring's early crop. The sprayer can be put to work painting and whitewashing in the sunny fall days.



Preplanting fertilizer applications, wild onion control are done in the early spring. Broadcast fertilizer applications, rootworm spraying before planting and early [illegible] insect and [illegible]eed control can be started. Fruit tree spraying is starting.

Summer brings the hungry, chewing insects. There are corn borers and boll weevils to fight and weeds to spray. In the dairy it is time to start fly control. Spittlebugs and aphids in the alfalfa, and grasshoppers everywhere; spraying is the only way to control them.

Post-emergence weed control, fertilizer application, and pasture insects keep the sprayer busy in the spring. Foliage spraying for killing brush and trees can be done now.

"Things got so bad last year we had about decided to fertilize our cotton extra heavy so there would be enough cotton for the boll weevils and us planters, too," says O. A. Craig of Wilson, Arkansas. "Now with the new spray programs we've got them under control."

Tanks can be mounted on 3 point hitch brackets, Fast Hitch platform, in front of the tractor, on trailers for easy hook-up behind the tractor, on skids for sliding onto pick-up bodies, or big tanks can be put directly on the truck chassis.

The Pressure Regulator

The pressure regulator is usually the control center for the sprayer. It is mounted where it can be operated from the tractor seat. It should be made from corrosion-resistant metal. It has a pressure gauge and the spraying pressure can be set with a handle. It will maintain this pressure to the hose and nozzles no matter what the tractor power take-off speed may be. A second and very important function of the pressure regulator is to provide a by-pass to return the excess liquid to the supply tank where it is used to keep the solution agitated. The pump usually supplies more liquid to the system than can be used and this return through the by-pass serves to keep the pressure constant. A strainer to take out foreign materials is usually incorporated into the line near the regulator. The inlets on the regulator take liquid from the supply tank and the outlets feed the boom, jet sprayer or gun sprayer.

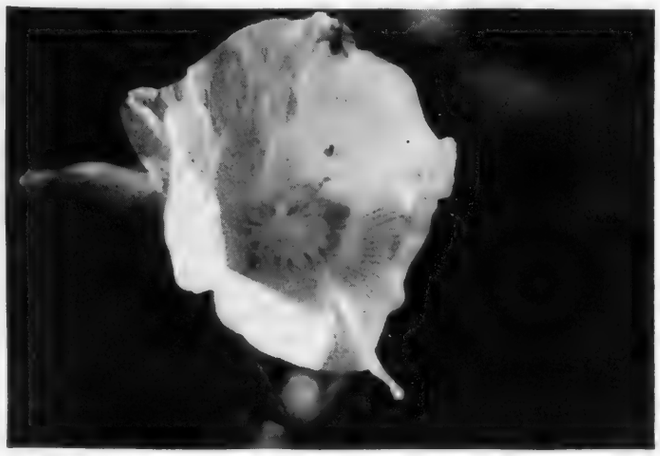
The Hoses and Nozzles

Garden hose can be used for the tubing on the sprayer. The safest and longest lasting hose is neoprene or plastic. It should be of a large enough size so as not to cut down on the flow of the liquid. Sprayer nozzles have been the subject of intensive research in the last few years. There are several types, flat spray or fan, hollow cone and solid cone. The names come from the shape of pattern produced by the nozzles under pressure. There are several hundred variations in size and shape of the orifice tips providing a wide range of capacities. Nozzles made from aluminum and stainless steel are best suited to farm use. The nozzles are attached to the sprayer boom with a plated clamp. There is a fine strainer inside the nozzle body and the disk or orifice is interchangeable to provide various spraying rates and patterns. A nozzle may also be blanked off by inserting a closed disk. Nozzles must be fitted to the material being sprayed so as to give the right coverage applied in the right pattern. This information is supplied with each sprayer and should be followed carefully. Cone pattern nozzles are usually used for insect control and the fan type is used for killing weeds. The application rate for these is usually 5 to 10 gallons an acre at 35 pounds pressure and 4 m.p.h. speed. For applying liquid fertilizer, stainless steel flooding nozzles should be used; their flow ranges from 50 to 100 gallons per acre.

Sprayers Are Here to Stay

So, for fruit trees and uses where high velocity fog-type of spraying is needed, high pressure outfits should be considered even though the cost is higher. For row crops like corn and cotton, high clearance is of prime importance, with scientific placement of nozzles to cover the topsides and bottomsides of the leaves, through the entire season. For big farm operations, big tanks, big capacity pumps will save time and speed up the field coverage. For small spraying operations, a jet nozzle, plus a gun, will do a first-class operation.

By now most farmers are familiar with the benefits to be obtained with spraying: labor saved, crops freed from insects, weeds eliminated, and yields increased. Yields of alfalfa have been increased by 1000 pounds an acre when spittle bug was controlled; additional gains of 50 pounds per head during the fly season on beef cattle over non-sprayed herds; two hundred pounds more milk during a two-month period on a dairy cow protected from flies; sprayed corn with weeds controlled produced



This is the beauty and the beast of the cotton fields. The delicate pink cotton blossom is easy prey to the pesky boll weevil. He can destroy the cotton in blossom, in squares, or in the boll stage.

an average of 15 bushels more per acre; cotton sprayed through the season yielded nearly 3 bales against 1 bale on nearby unsprayed fields.

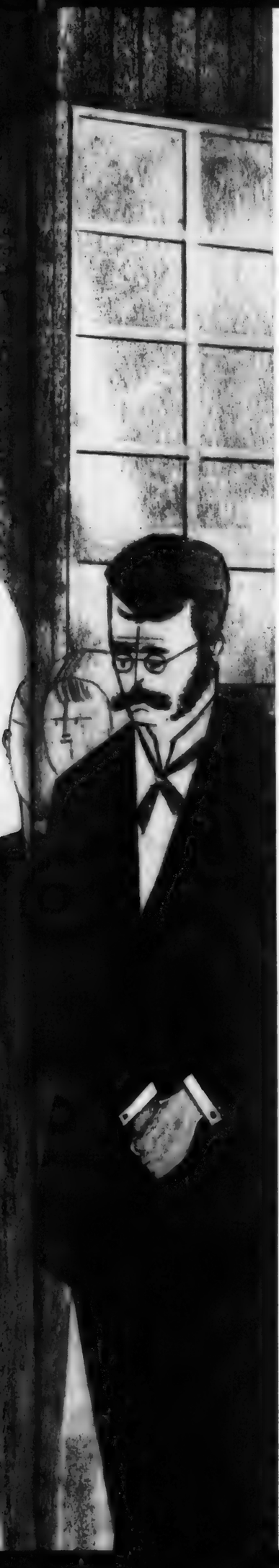
These are spraying benefits most farmers are aware of, yet many a sprayer that is sold is the wrong one for the farmer to buy and the wrong one for the dealer to sell. The sale is made in a hurry because the grasshoppers are moving in and and even the wrong sprayer seems like some help. Farm spray experts say the time to buy a sprayer is before you need it. Prices are better, the dealer is better able to study your needs and get the right model for your farming.

Corn and Cotton

The largest number of farm sprayers and the biggest volume of spray material goes into corn and cotton crops. The spray programs on these two crops are so important to so many farmers that current control programs for weeds and insects are outlined here.

(*Continued on page* 98)

"You can't raise cotton without a high-clearance sprayer," says Lewis Ralph (above) of Route One, Joiner, Arkansas. When this photograph was taken Ralph was giving a blossoming cotton field a high-speed drenching of endrin for boll weevil kill. He was using 18 gallons of water per acre, running 9 m.p.h. at 60 pounds pressure. Using a steel tank and stainless steel nozzles, the trailer-type sprayer (right) is being used to apply a complete liquid fertilizer to a pasture. On the Louis Strasburger farm (below) near Earl Park, Indiana, the big July spraying job is applying DDT for corn borer. Large quantity cone-type nozzles are shooting the spray material directly into the whorl of each corn plant.



A VERY HARMONIUS MARRIAGE

By Leon Hale

courtesy "Humble Farm Family"

AT ONE TIME in the old days of our community lived Therman Smirt, Jr. and his wife, Mrs. Therman Smirt, Jr. The Smirts were considerable famous, for they were married for 78 years and not one harsh word ever passed between them. As far as anybody knew in our end of the county, this was a record. Mrs. Smirt was a Hazlick. This meant more than a little around our community. For her papa, Old Man Zoro Hazlick, owned half the Morgan Creek watershed, with plenty of good red bottomland spreading around here and there.

On the south, Hazlick land joined with Smirt land. Therman Smirt, Sr. owned almost to the acre as much as Old Man Hazlick.

Now on the same day as Therman Smirt, Jr. was brought into this world, Zoro Hazlick's wife presented him with a daughter, May Lou Hazlick. As you can see, then, Therman, Jr. and May Lou were very much the same age, give or take an hour and 15 minutes.

Well, Zoro and Therman, Sr., the proud papas, got to discussing back and forth one day about how proud it would be if Therman, Jr. and May Lou were to marry up, for then together they could some day own the biggest swath of ground in the county.

Both Zoro and Therman, Sr. went along for three or four years, dreaming that such a thing would come to pass and worrying that it wouldn't. So one day Old Zoro said to Therman, Sr. that young folks being what they are, it might develop that May Lou and Therman, Jr. would not cotton to each other, and might even marry up with some offbreeds somewhere, and spoil the setup.

"Well then," said Therman, Sr., "for their own good, why not let's get them married up right now."

"Call the preacher," said Zoro.

And so it was that Old Brother Tolliver, the minister, came out to the Hazlick place and tied the knot all nice and proper, with Therman, Jr. and May Lou having no more idea than a burnt stump what is going on, for between them they could not add up 8 years worth of age.

But it was done, and Old Brother Tolliver would say in later years it was the only wedding he ever performed where the bride and groom argued during the ceremony over a piece of molasses candy.

Well, May Lou and Therman, Jr. naturally went on back home to live with their proper mamas and papas, until the time would come when they could be informed of this development.

But then the matter of the mules came up. Zoro and Therman, Sr. had this falling out over a trade on the span of mules, and as you may know, there was nothing in those days would cause a falling out quicker than a bad trade on a span of mules.

And in fact Zoro and Therman, Sr. never spoke to each other for the rest of their days. And Therman, Jr. and May Lou were not permitted to speak to one another all the time they were growing up, although married as legal as a law suit.

When 21 each, they were informed by their mamas of the marriage, but neither seemed to be much impressed, since they had not cast eyes on each other since the age of four. Their papas would not hear of them speaking to one another anyhow, still being mad about the mule trade.

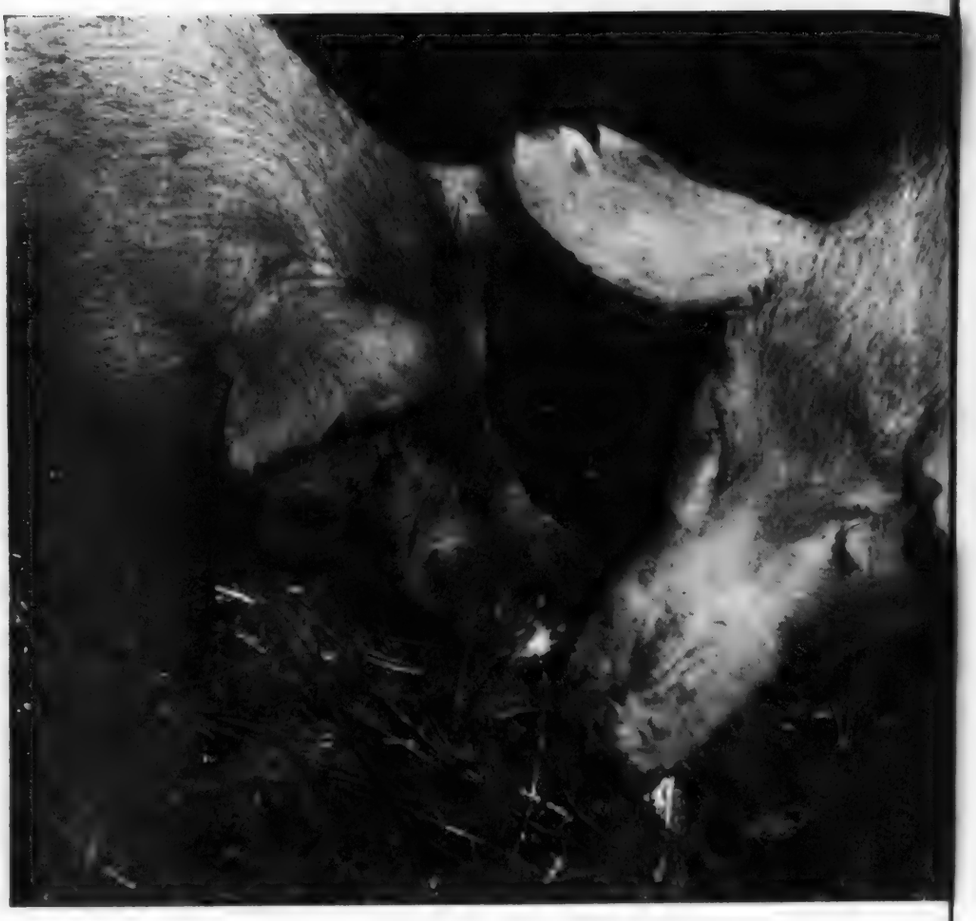
Things might have worked out different if Old Zoro and Therman, Sr. hadn't hauled off and lived to be 106 years old each, and when they were finally laid away, Therman, Jr. and May Lou were both pushing 67, and somewhat set in their ways.

Folks always said it was a shame, being married and all, that May Lou and Therman, Jr. didn't live under the same roof. But they never did, both being satisfied with the way things were. And the truth is that in all the years they lived, they never as much as traded half a sentence of conversation, although now and then when going about their business they would wave to one another very friendly from a distance of a quarter mile or so.

And that's how it was that Mr. and Mrs. Therman Smirt, Jr. were married for 78 years and never a harsh word passing between them.

Unless you want to count the argument over the piece of molasses candy.

Good silage can cut feed cost, help sows produce more pigs, and increase the number of pigs saved



Sows thrive on Silage

SOWS, LIKE MOST FOLKS, eat for two main reasons: for nourishment and in order to enjoy the feeling of well-being that goes with a full stomach. Farmers who understand sow psychology are able to cut the cost of their pigs 25 to 40 per cent by supplying the nourishment the sow needs in the form of supplement and the nutrients found in good corn or grass silage—her craving for a full gut is satisfied with the fiber and bulk of the silage.

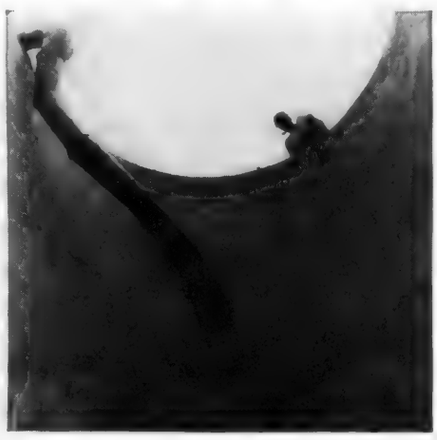
Farmers and experiment station men who have tried this system of feeding claim that there is a good deal more to it than just a saving in feed. The sows, they point out, are trimmer and healthier at farrowing. Their good condition prepares them for easier farrowing and fewer overlays. Larger litters of healthier pigs go along with silage feeding and there is some reason to think that the acids in the fermented feed tend to inhibit worms.

On the northern edge of the corn belt, Dr. William Rempel, a scientist in the Animal Husbandry Department of the University of Minnesota, has been following the grass silage feeding experiments for seven years. "We turned to grass silage recently," he said, "because of the difficulty of getting in hay that hadn't been rained on. And we turned to silage in the first place to cut costs. We have tried both long and chopped silage with about the same results. The sows seemed to like the long silage well enough—you should have seen them with long strands of silage hanging out of their mouths—but the savings we had hoped to achieve by not chopping it didn't materialize.

"We open our trench silos around the first of November," Rempel continued, "when the last green is gone from the paddocks. We feed the same silage to our sheep as we do to the sows, an alfalfa-brome mixture, and we find that we get about the same results with silage as we do with good pasture as far as the number of stillborn pigs is concerned."

The silage is fed in flat, shallow troughs at the rate of 8 to 10 pounds a day for gilts and 10 to 12 pounds for sows. It is put out in the morning with the supplement sprinkled over it and the herdsman tries to estimate the amount they have cleaned up the day before and keep pushing the silage. At first the sows eat the grain and supplement and just nibble at the silage, but gradually they get a taste for it and increase their consumption.

"Let's face it—a sow is not a ruminant," Rempel said, "you need a supplement. In the beginning we erred on the side of too much silage; now, we have found that five pounds a day of our balanced ration along with all of the silage they will eat is about right. During sustained cold spells, when the sows



Either grass silage, (above) or corn silage can be used for feeding sows. Corn silage should be cut extra short. To thrive, sows need the best silage made.

just won't come out of the bedding to eat silage a belly-full at a time, we increase the supplement to six pounds a head.

"At the time we started silage feeding," Rempel continued, "Dr. L. M. Winters, who started the project, wondered if the acid of the silage might not have an effect on worms. It had been reported that the lactic acid of buttermilk kept down the worm count in chickens. So, I had the job of counting worm eggs. The silage seemed to have a slightly inhibiting effect, but we finished the test quite certain that we would never want to rely on silage as a wormer."

Corn Silage

Herman Tripp, a specialist in feeder pig raising at Paton, Iowa, began silage feeding in the fall of 1956 and learned that he could reduce the cost of producing pigs 30 to 40 per cent. He also learned, the hard way, that corn silage needs a supplement—perhaps the word balancer would be better, since Tripp went wrong on the word supplement—to make up for nutritional deficiences in corn.

Due to a drouth that was drying the corn prematurely, Tripp cut his corn early and had silage ready when he flushed 47 sows for fall breeding. Flushing consisted in shoveling silage, a scoop to a sow, over the fence into a trough and topping it with seven pounds of pelleted supplement. He started the flushing two weeks before he turned the boar in and kept it up for another two weeks afterward.

After breeding, Tripp began feeding around 12 pounds of corn silage per sow. The silage was fed in troughs in the morning; in the afternoon it was laced with a half pound of supplement per sow to encourage appetite. This tidbit of supplement encouraged the sows to clean up all the silage that remained. The 45 per cent protein supplement, however, was neither the right kind nor the right amount.

Corn silage is a good roughage, but it is far from being a complete ration for either hogs or cattle. Soon after the sows farrowed, Tripp began to lose baby pigs from hypoglycemia, a vitamin B deficiency disease. He had lost four of them when he went into action with preventive feeding of a special vitamin mixture and stopped further deaths.

Later, Tripp got in touch with Dr. Damon Catron, an expert on swine nutrition at Iowa State College, who has done a great deal of work on this problem. Catron was able to give him the formula for a feed which can be used as a balancer for corn silage. This formula is shown in the next column.

In going over the silage feeding program, Catron approved the use of silage and supplement as a flush feed: Catron recommends starting silage a bit earlier, however, three or four weeks before breeding, or immediately afterward. And when Catron speaks of silage, he is talking of the finest corn silage that a farmer can make. Chopping it as short as possible will save silage, for the sows will pass up the larger pieces, but the main emphasis should be on doing a good job of excluding air by packing and covering the silage. The higher the quality, the more palatable and nutritious it will be.

Since even the best silage lacks certain essential nutrients, Catron and his associates have developed the corn silage balancing supplement which they feel is the best for this job. If this feed cannot be obtained, they recommend as a second choice feeding a good commercial sow supplement and adjusting the protein to 20 per cent by adding ground corn.

Catron divides the silage feeding time into three periods and has separate recommendations for each for feeding the balancer. During the flushing period he suggests feeding four to five pounds of the balancer to both sows and gilts along with all of the silage they will eat. For the first two-thirds of the gestation period he recommends feeding the gilts three to three and a half pounds, and sows two and a half to three pounds of the balancer. And finally, during the last third of gestation, at about the eleventh week, the balancer should be stepped up to four to five pounds for both sows and gilts to take care of the rapid fetal growth which starts at this time.

While the same program and balancer that has been worked

(*Continued on page* 96)

CORN SILAGE BALANCER

Ingredients	Pounds
Ground Corn	702
Wheat middlings	300
Solvent soybean oilmeal	250
Meat and bone scraps	300
Condensed fish solubles	50
Dehydrated alfalfa meal	200
Distillers dried solubles	50
Defluorinated phosphate (38%Ca, 18%P)	20
Salt (iodized)	20
Molasses	100
Trace mineral premix	8
Vitamin premix (in quantities shown below)	

Vitamin Premix

Vitamin D_3, million I. U.	2
Riboflavin, grams	4
Calcium pantothenate, grams	10
Niacin, grams	25
Choline chloride, grams	60
Vitamin B_{12}, milligrams	20

GRASS SILAGE BALANCER

Ingredient	Pounds
Corn or barley or both, ground	500
Oats or oats and bran half-and-half	250
Tankage	50
Soybean meal	50
Bone meal	8
Salt with trace elements including potassium iodide	8
Protector B	1½

Neither corn nor grass silage is a complete ration for sows; each needs to be balanced with a supplement. Above are the balancers recommended by Iowa State College for corn silage and University of Minnesota for the grass silage supplement. Herman Tripp (below) makes silage for his sows; most farmers feel that swine and cattle must share silage-making costs to make it pay.

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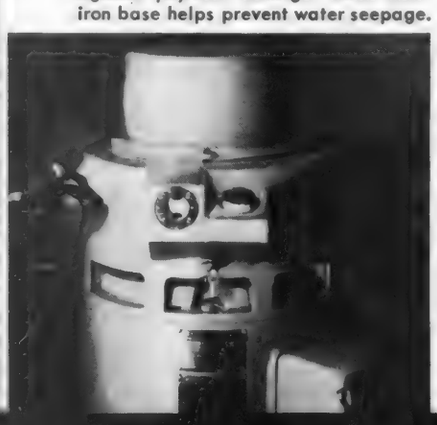

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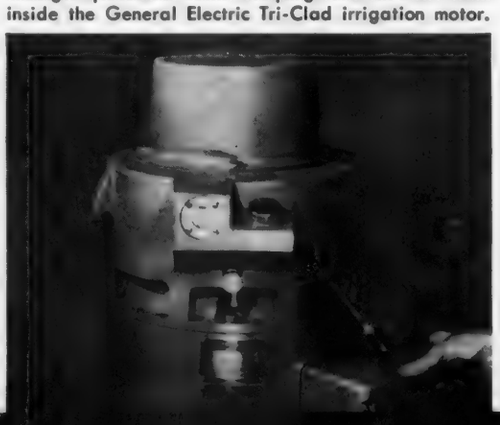

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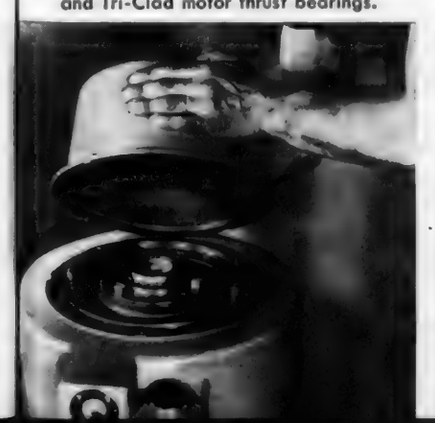

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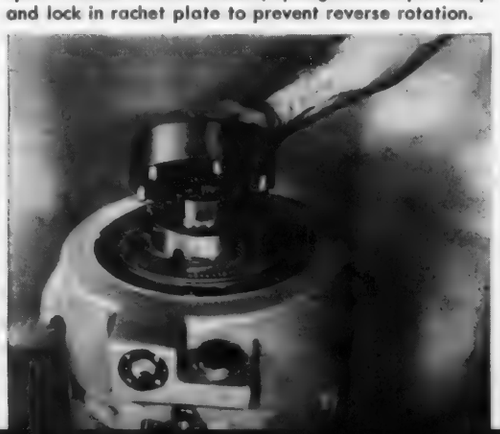

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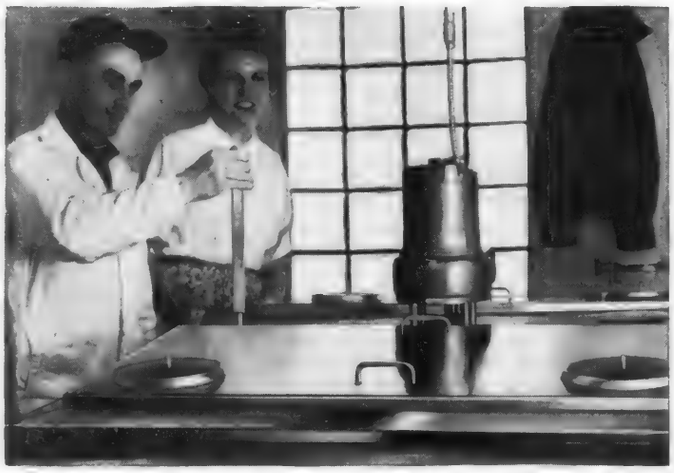

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HOW MUCH IS A PASTURE WORTH?

(*Continued from page* 49)

kind he wanted. He rebuilt the filter on his bulk tank because the one that came with the tank was not doing the job he thought it should and "was too expensive, anyway." So it is to be expected that he would check for himself on the returns he gets from his annual fertilizer bill.

He set up a simple experiment using one acre of an alfalfa-brome mixture and one acre of Ladino, using his ordinary fertilizer applications. He got the very satisfactory yield of 8545 pounds of milk per acre from the alfalfa-brome, 8415 pounds of milk from the acre of Ladino. Then he poured 800 pounds of 10-10-10 and manure to a one-acre plot of alfalfa-brome and pumped 12,017 pounds of milk out of it. This increase of 3472 pounds of milk over the 8545 pounds yielded by the alfalfa-brome with the more conservative fertilizer application would amount to a cash receipt of $138.88 with milk at $4 per hundred. The cost of the additional fertilizer at $55 to $60 per ton would be only about $22 to $24.

Incidentally, many dairymen hesitate to manure their pastures when they are attempting intensive grazing. Johanning's practice is to get it on in the fall and early winter, long before the grazing season starts. Then, he says, the cows don't mind it at all.

When Johanning made his record his pasture was in the second year of its stand. This past summer was a dry one in that part of Wisconsin, but the field was still looking good and he was debating whether he should tear it up in line with his rotations or stay with it another year. The longer you maintain a stand, he concluded, the cheaper the cost of production, so it stayed in sod.

Henry Prange, another top Sheboygan County dairyman, farms by an iron-clad rule that two years in pasture is enough for any piece of land no matter how good the stand. Prange was runner-up to Johanning in the pasture contest with a return of $233.84 of milk per acre. He is a stickler for details and, like Johanning, a practical innovator—he was probably the first to use a portable water tank with attached drinking fountains in connection with his strip grazing. He not only has a highly successful dairy operation, but a first-class seed business as well. To his way of thinking there is just one thing to do with a meadow after two years in sod—plow it under. This, he feels, gives better weed control, builds up humus and promotes a better stand.

Prange made his record with 40 Holstein cows on 14 acres of alfalfa-brome pasture which he divided into strips, moving his cows from one strip to the next every two days. His cows produced 102,613 pounds of 3.46 per cent milk in 98 days on this pasture. The cows consumed $24 worth of silage during this time plus $362.18 in grain for a total feed bill of $386.18. The milk sold for $3,659.92, leaving a net of $3,273.74. The average feed cost per 100 pounds of milk was 37.9 cents.

There are two things which impress the stranger who drives into the Prange farm for the first time. The first is the beautiful homestead with its spacious lawn, the venerable brick house and the impressive dairy barn to the north of the house, much of it built from home-grown and home-sawed timber. Then, around to the rear of the barn, one can't miss the big Graham-Hoeme plow sitting as if alerted for immediate use. It gets plenty of use, too. Henry Prange's theory is that the way to build good pasture is to go all out with this tool. His rotation is one year of corn, two years of small grain, usually oats, then three years of meadow, the first of these three years being devoted to a hay crop and the last two years to pasture. In starting a rotation he goes over an old sod with the Graham-Hoeme in the fall. And that is a thorough going-over; not just once, but four or five times, going down to a depth of about 18 inches. The point is he wants to open up the ground so the moisture can work in during the winter and the thorough working also helps to get rid of the weeds and quack grass. He fertilizes his corn to the extent indicated by a soil test, then puts on another 500 pounds of 10-10-10 per acre when he sows his meadow mixture with

Above: Sprinkler irrigation powered by a Marlow Pump provides lush growths to feed 100 dairy cows.

Below: This Marlow has run 12 months a year, 18 hours a day for the past 3 years, without service due to the pump.

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In this area all farmers have a monthly "basis." They get $6.35 per 100 pounds for all milk produced up to this amount every month. All milk produced over this established amount is called "surplus," and for this they get $3.35 per 100 pounds. With his irrigated farm, Mr. C[illegible] finds that he can get his base quantity all year, even during the hot summer months. Since the profit is on the "basis," he gets a profit every month and irrigation really pays. The "surplus" is sufficient to cover purchased feed costs only. With irrigation, another profit is obtained on the "surplus" since he is able to use green feed without purchasing hay.

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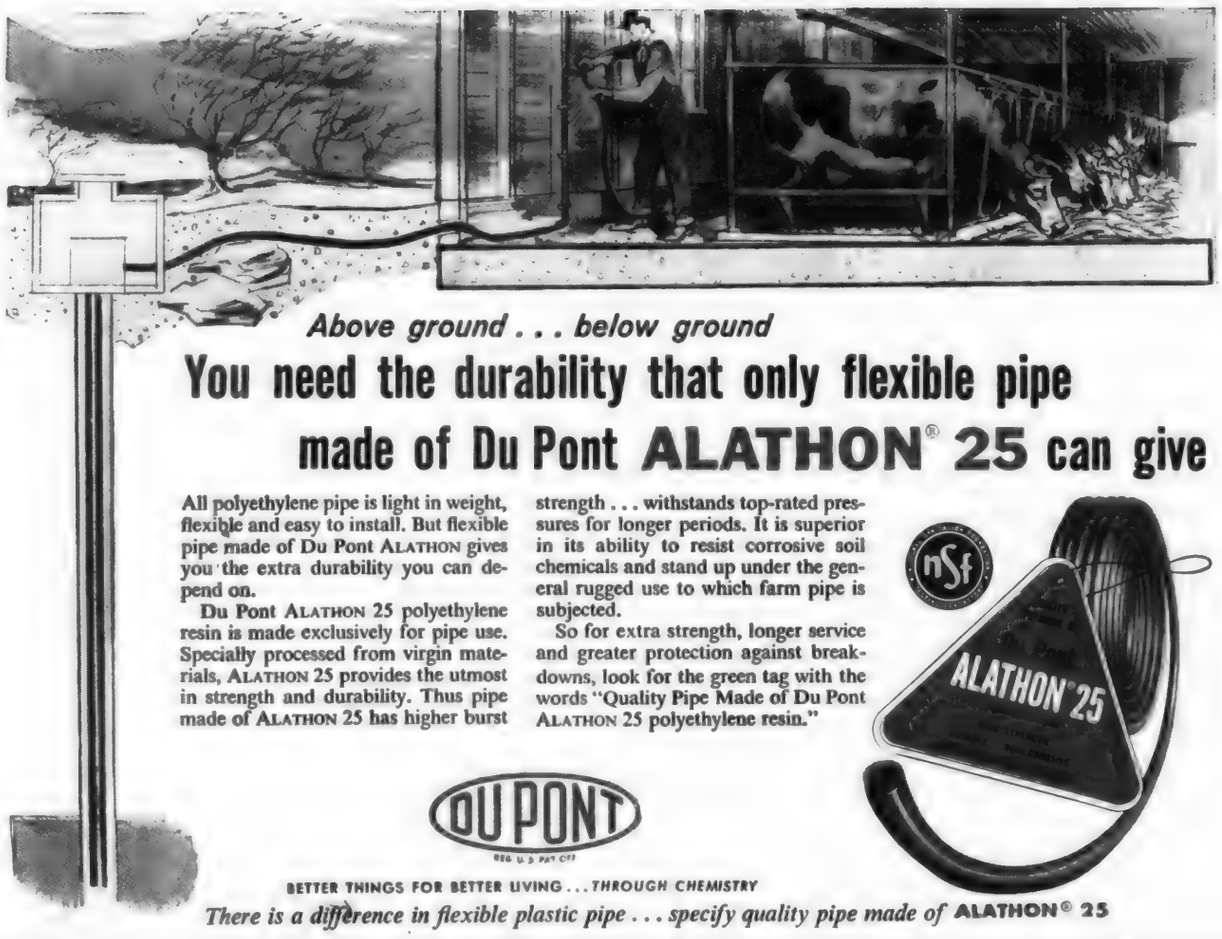

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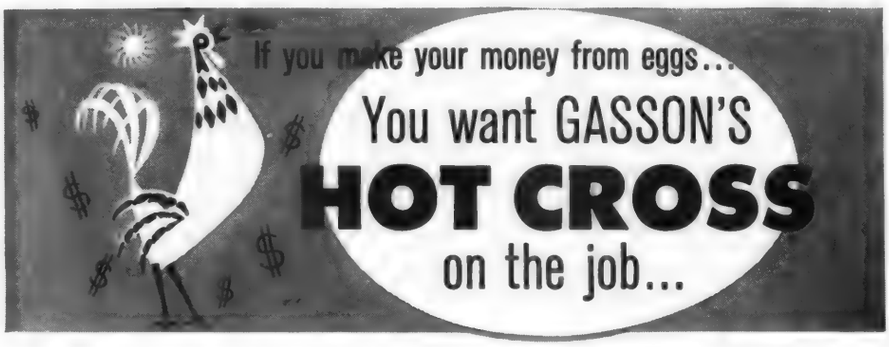

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the second year oats. His pasture seeding is 10 pounds of alfalfa and 4 pounds of brome.

Prange feels that Ladino is too hard to handle for hay and he does not think it contributes enough to his pastures to bother seeding it.

While he does not change his pasture strips as frequently as does Johanning, he is convinced it is essential to keep the cows on good, succulent forage and that the smaller the strips and the faster they can be rotated, the more milk will result.

The water wagon is essential for getting the maximum returns from strip grazing and it is a common sight on these highly efficient farms. It takes water to make milk just as surely as it takes good grass and legumes. Prange proved to his own satisfaction how important the water is. He once tried leaving the tank out of the field. Result: Milk yield from his 40 cows dropped 100 pounds per day.

Ray Born is another Sheboygan County dairyman with a phenomenal record. His mark was $197.60 per acre in milk from 40 Holsteins on 25 acres. He pastured this field for 128 days, rotating his strips every two or three days, and came up with 166,449 pounds of 3.47 per cent milk with a value of $5,392.94. He fed $608 in concentrates and $197.60 in silage, leaving a net credit to his 25 acres of $4,587.34.

Born is more of a rule-of-thumb operator than Johanning and Prange in that he allows himself more latitude in his operations. The length of time he leaves a field in pasture, for example, depends entirely upon how good the stand is. He has one field which Ladino has now largely taken over that is in its sixth year. "The longer you let it stand the cheaper the cost of production," he says.

Then on the rotation of his grazing strips he is guided pretty much by the day to day performance of his cows. His strips are 2½ to 3 acres in size. He always leaves the cows on a strip for two days.

At the end of the second day, as he says, "I go out myself to see how the stand looks and I check carefully on how milk production is holding up. If the stand looks pretty good and production hasn't slumped I'll leave them on the strip another day. If the stand shows signs of a beating or production is off, I'll move them immediately. I can never leave them on a strip for more than 3 days."

Johanning, Prange and Born were the top three dairymen in Sheboygan County and their records were exceptional. But when the average of the top 16 dairymen is considered it becomes apparent that returns of upwards of $100 of milk per acre are within the reach of any operator who is willing to bear down.

These top 16 dairymen milked a total of 529 cows, pasturing an average of 262½ acres for an average of 102 days. This was an average of 2 cows to the acre. The cows were fed an average of 4.75 pounds of concentrate per day, ½ pound of hay and 13.97 pounds of silage for an average feed cost of $16.30 per cow. The average net value of the milk per acre was $144.80.

As can be seen from the operations of the three leaders, the one thing they exhibited in common was careful management, which came as the result of years of experience. One man rotated his strips three times a day, another one once every 2½ to 3 days. One man never let his fields stand in pasture more than two years, the other two were much more flexible in this matter. But they all had good cows, freshening at the proper time to make full use of the excellent pasturage. And that excellent pasture did not just happen. It was planned and nurtured to the point where, as one observer noted, "It almost makes milk without cows."

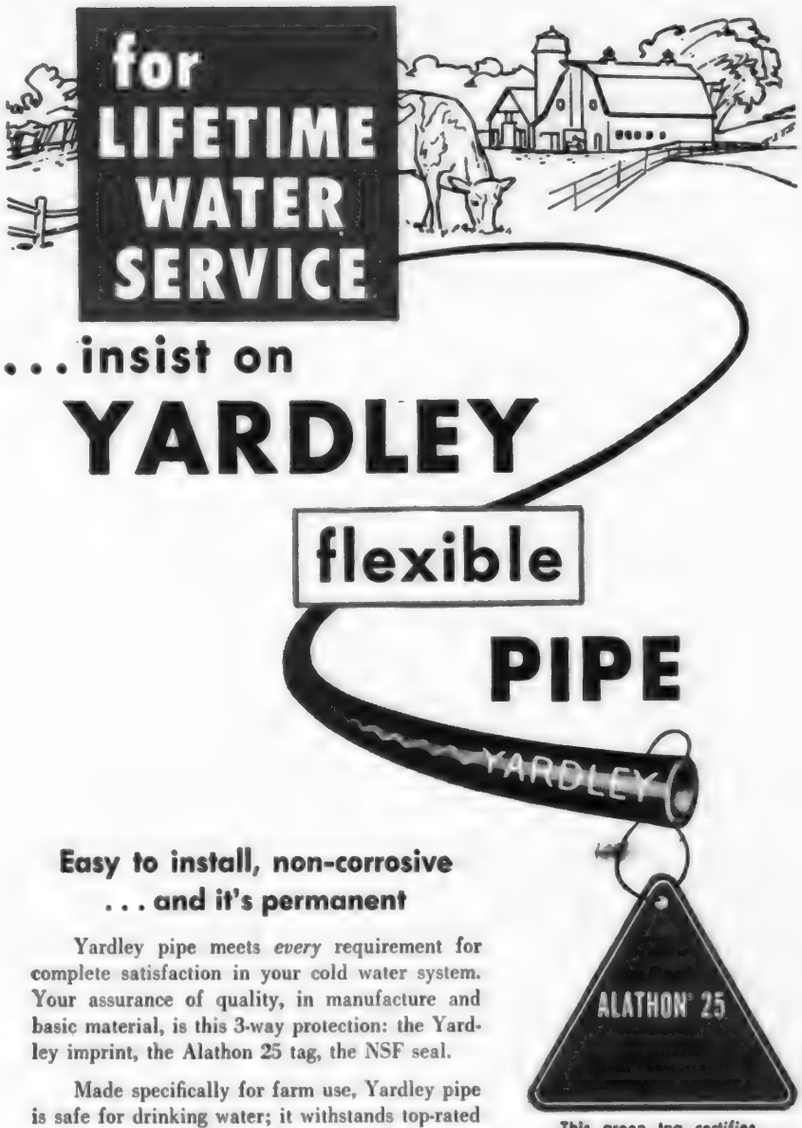
RAIN ISN'T ENOUGH

(*Continued from page* 60)

they had the water.

In what Hoosiers call their pocket area, near Vincennes, Indiana, Art Stangle, who farms some 720 acres of land, says that irrigating field corn, milo, and alfalfa was definitely profitable even last summer, when they had more than average rainfall.

"Our milo planting is rather interesting since we used milo this year to get two crops off the same land. As soon as we got our wheat off, we put in the milo with a heavy application of Uran—a 32 per cent nitrogen, liquid fertilizer—enough to give us seventy pounds of actual nitrogen to the acre. The milo just stood there until we gave it an inch and a half of water. Later, we gave it a second inch and a half. This extra water along with our normal rains gave us a crop that combined a hundred and twenty-five bushels



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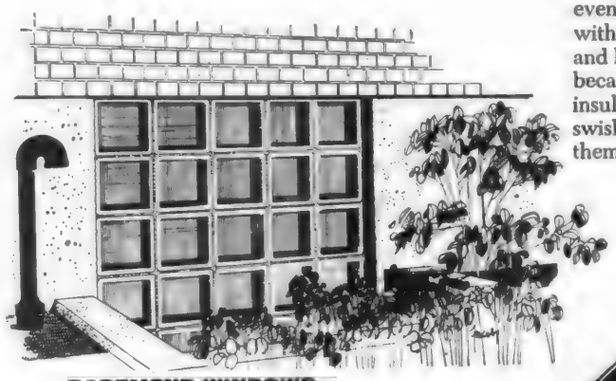

BASEMENT WINDOWS—

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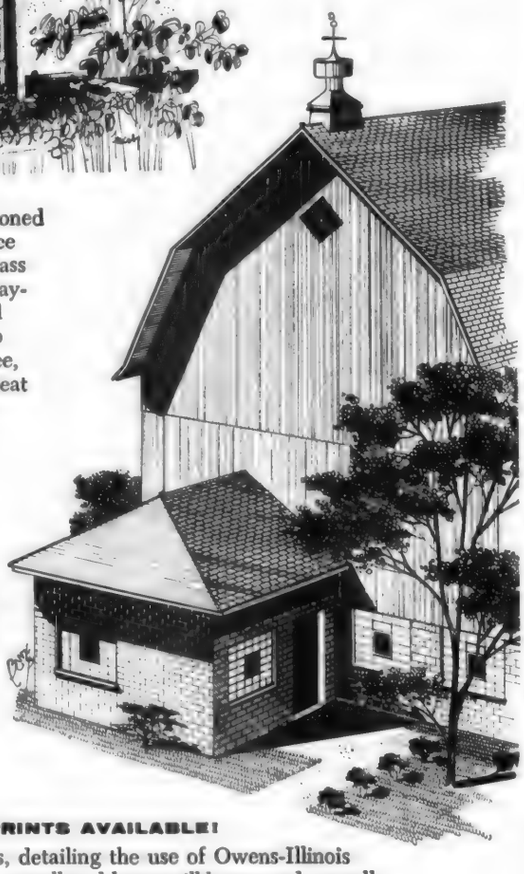

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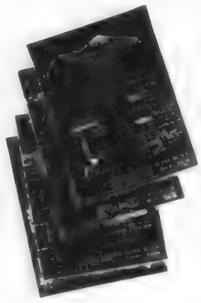

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to the acre. This was our first experiment with this system of following wheat with sorghum. It is pretty hard on the land and takes a lot of fertilizer to make it work. Right now, we feel that it will go best on our lighter soils."

Stangle also used his irrigation on his corn and alfalfa. The corn was given one irrigation of two inches of water. It yielded 130 bushels to the acre. This is a handsome return on fertilizer and water, which Stangle figures costs him $3 an acre inch. He keeps his cost low, incidentally, by moving pipe with a jeep which has racks built on it to hold a quarter mile of six-inch pipe. Stangle claims that his labor costs have been held down and that the jeep can get in and out of wet fields that would mire down his most powerful tractor pulling a wagon.

Alfalfa is a cash crop on the Stangle farm. He fertilizes the crop heavily, putting on 200 pounds of 0-20-34 to the acre after the last cutting and some years following this up with an equal dose of the same mix in the spring. Heavy fertilization goes along with irrigation in order to get the maximum production from a crop. "We made two trips over the alfalfa with our water and it certainly paid off," Stangle said. "We took five cuttings of alfalfa—the first four averaged a ton and a half dry weight and the last one a ton for a total of seven tons to the acre. Other farmers around here who are selling alfalfa the same as we are, but who are not irrigating, averaged from a quarter to a half a ton less per cutting and were only able to take four cuttings for the season. We had one little demonstration of the effectiveness of irrigation right here on our own place. We had irrigated half of a thirty-acre field when we were caught in a rain and stopped irrigating. This was the last irrigation of the season. Well, the piece that got both irrigation and rain produced about twenty-five per cent more on the last cutting than the fifteen acres that got rain alone."

Wondering just how many years had good enough rainfall to have made irrigation unnecessary, Wayne L. Decker, Climatologist of the Soils Department of the University of Missouri, went back through the weather reports in central Missouri for 67 years. "By making a few assumptions," Decker said, "it is possible to estimate from weather data the number of times that irrigation water should have been applied during the past years. Such estimating is not perfect, but it should give the farmer a rough estimate of the expected frequency of irrigation treatment in both dry and wet years.

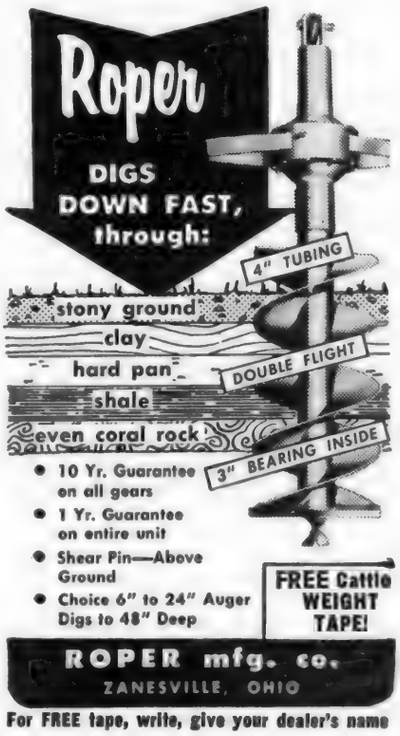
"Using weather data, the amount of water used by a plant cover was computed for each day," Decker continued. "Whenever 50 per cent of the soil water available for plant use had been used, a two-inch irrigation was assumed. The number of times that irrigation was needed to

bring the soil above 50 per cent of its water-holding capacity was calculated. These irrigation frequencies were computed for each of the past 67 years at Columbia, Missouri."

When all of the figures were in, Decker found that in the past 67 years only four needed no irrigation. In the remaining 63 years, irrigation should have been applied once during five of the years, twice during 17 years, three times during 13 years, four times during 12 years, and from 5 to 9 times during the remaining 16 years.

Decker has been able to check his calculations against actual practice during the past few years. During the drouth years of 1952 and 1953, corn yields were increased 26 to 28 bushels per acre with irrigation—but the weather data indicated that twice as much water should have been applied in 1952 and five times as much in 1953. In 1955 and 1956, two good rainfall years, more water was applied to the test plots than the weather computations called for. The result was around 150 bushels of corn each year, 75 and 24 bushels per acre above what unirrigated corn made in 1955 and 1956.

"Much research remains to be conducted on the use of water by plants," Decker cautions. "On the basis of these preliminary values, however, it appears that irrigation can be used sometime during the growing season in about 19 years out of 20."



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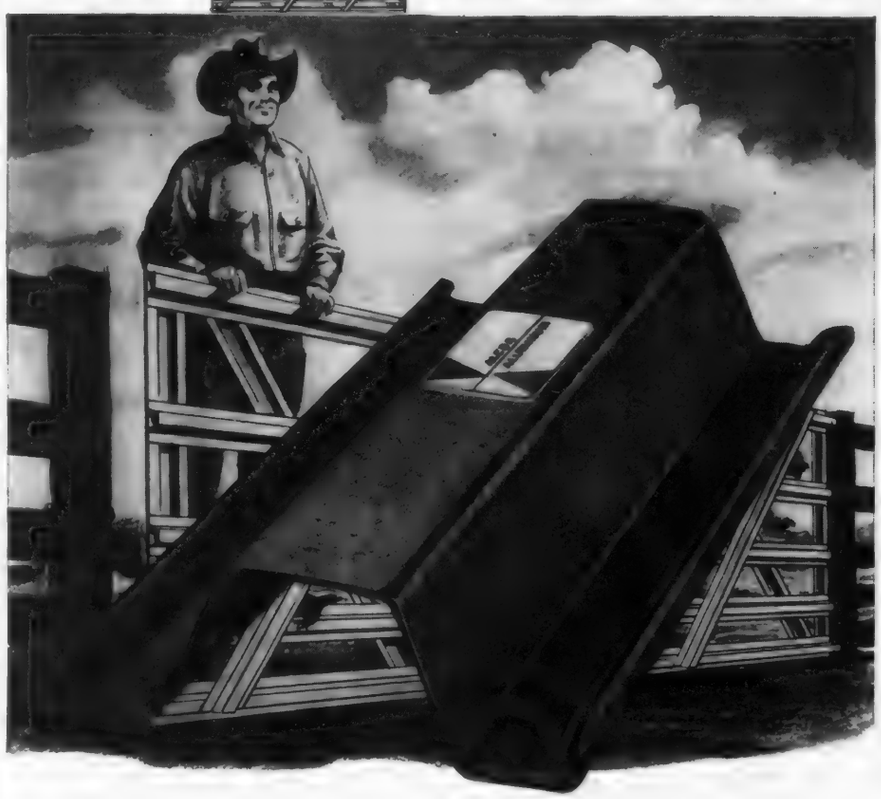

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This Armco Steel Building makes an efficient loose-housing barn for dairy cattle. Post-free interior assures easy access for cleaning.

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NOW IT'S TRANQUILIZERS

(*Continued from page* 65)

pens of steers and lambs closely and can notice no slowing down of the animals. They have even put pedometers on the animals to see how much those fed tranquilizers move around in comparison with the controls. The difference was nil.

Some think the tranquilizers may have some effect on fermentation, acting on the rumen microflora, but this is not certain.

Another theory, drawing an analogy from human medicine where it is believed that the drugs block certain of the nerve ends, is that the tranquilizers block the nerves which control certain glands or those which regulate intestinal motility. This might slow down the movement of the food through the intestinal tract and allow the animal to utilize it more efficiently.

When tranquilizers will be released for farm use as approved feed additives is another unanswered question. There are three broad tests which any additive must meet before getting final approval from the manufacturers and the various governmental agencies concerned:

(1) It must increase production economically;

(2) It must have no harmful effect upon the animal; and

(3) The final product (the meat, etc.) must not be harmful for human consumption.

The tranquilizers seem to have cleared the first of these two hurdles very easily. To get them over the final one is going to take more research, including the use of radioactive tracer materials and similar techniques to determine whether residues are left in the final product and, if so, whether or not they might prove harmful. Until such time it would be illegal for anyone to try to better the gains on his commercial livestock by dosing them with the drugs.

It's a good bet that tranquilizers will be an accepted feed additive for ruminants before too long. And for non-ruminants the day may come when they'll be slowed down to the point where, like a cabbage, they just stand and eat and grow.

HERRINGBONE DAIRY

(*Continued from page* 36)

Golay has said, "A single-row parlor will never quite equal the efficiency of a full herringbone, but it does retain the two essential, time-saving features—batch handling of cows and angle parking. Just analyze these for a moment. Each cow that goes through a conventional side-opening milking parlor requires six operations to get her in and out; opening the door to the holding pen to let her in, opening the gate to her stall, closing the stall gate, opening the gate to let her out after

ALFALFA: worth $200 per acre!

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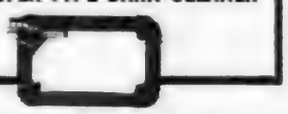
TRANSFER-TYPE BARN CLEANER



Gutter chain travels at 14 ft. per minute. Stays in gutters at all times. Solids and liquids are transferred to elevator hopper. Elevator paddles sweep through hopper, carry litter up elevator at 55 ft. per minute. Fast enough to get both solids and liquids with no run back. Litter is deposited in spreader.

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milking, closing it, and opening the door to let her out of the parlor. With fifty cows, that is three hundred separate operations. With a ten-cow, single-row herringbone, we've cut the operations to thirty. The angle parking of cows has shortened the walking distance for the operator. We put ten cows in the space it takes to park four end to end. Another argument for the one-sider is that we have been able to keep the price down by making use of existing buildings. We do this by putting up a shed-type building against the old barn to house the herringbone and using the old barn as a loafing pen. Later, if a man wanted to, he could add another side to his parlor and have a full herringbone."

One of the single-row herringbones is being operated by Robert Bishop, whose farm near Straughn, Indiana, is owned by his brother-in-law, Hoyt Vanderbeck. Bishop started dairying when polio laid him low and he found that he desperately needed a regular source of income to support his family and pay the hired man. Now, he does a full job himself, but he does it in spite of the handicap of a weak leg. "No one will ever know," he commented, "how painful it is to milk cows in a stanchion barn with a bum leg. With twenty-five cows, I did seventy-five deep knee bends to wash the udder, put on the milking machines, and take them off every morning and every night. After we switched to this new system my wife made two comments, 'You bring less of the barn into the house,' was her first one and, about ten days later she said, 'You know, you've not mentioned your leg hurting since you got the new parlor.' "

Bishop operates the parlor with 10 cows going through at a batch. Using five milking machines, he washes every other cow and puts on the milkers, then washes the remaining five and switches the milkers to them. When all are milked he turns them out and brings in another batch. "I expect to run a fifty-cow herd alone," Bishop said. "A neighbor up the road has a similar parlor and he milks thirty cows in thirty-five minutes. I figure that when I get my cows trained I'll be able to handle fifty an hour."

"One thing I'd like to say," Bishop concluded. "is that not everyone has a landlord like my brother-in-law who was willing to help when I needed it most."

Though few tenant farmers enjoy the

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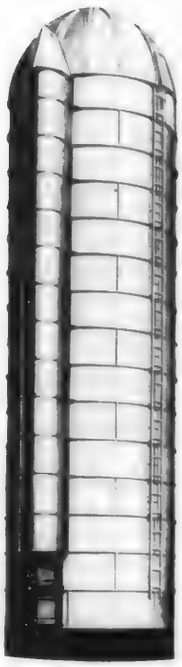

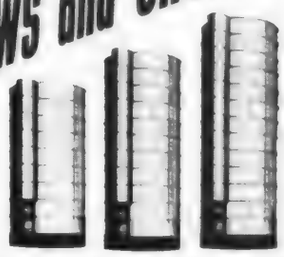

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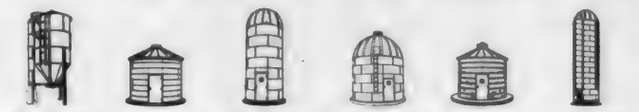

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kind of relationship Bishop has with Vanderbeck, more and more landlords are coming to believe that an investment in good working conditions for the tenant is a wise one. One of these is Richard Oughton, a Dwight, Illinois, banker who owns a number of farms in central Illinois.

Two factors led Oughton to dairying—he had a number of beef farms and wanted to diversify, and he had a tenant, Wilbur Curtis, who was an experienced dairyman. When he converted the land near the Cayuga Ridge from beef to dairy, he decided on a herringbone set-up from purely practical considerations. He wanted Curtis to be able to handle enough cows to make maximum use of the roughage-producing ability of the farm. The herringbone parlor seemed to be the answer.

From the point of view of the cow, every improvement in milking procedure will make her a better producer. She can't be quoted on this, but her production records fairly shout the fact that sloppy milking procedures cut her ability to give milk. Some experts in the field feel that the herringbone with its emphasis on speed will reverse the trend toward better milking to fast, sloppy milking. Questioned on this, Aavang, Curtis, Bishop and Buckland all claimed that they believe their milking procedure has been improved by changing to the new system. All of them mentioned that putting the cow's udder

Finkie's Fact File

by M. W. Finkenbinder

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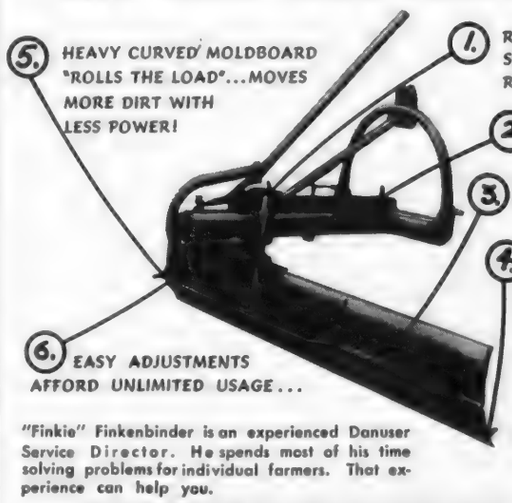

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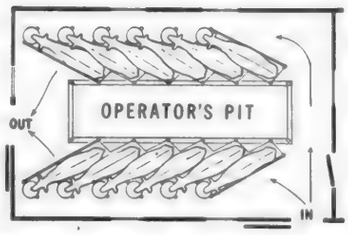

The cows stand at a 30° angle on a raised area, with heads out. There are no dividers or gates between the cows. The cows move in a group almost as fast as a single cow. They may be handled in single or double rows. One man can handle 2 rows of 6 cows with 6 milker units or a single row of 10 cows with 5 milker units.

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up to eye level with the walk-ways and pit of the parlor made it possible to do a better job of milking. None of them could detect any permanent drop off in production that could be attributed to the milking parlor. Buckland reported that production had been cut in half the first few days after the change over, but it quickly went back to normal. Aavang felt that the new system was helping his cows. "Loose housing is a lot more healthful for the cows, it seems to me," he said. "At any rate I have had practically no mastitis or sickness since I changed over to loose housing—and mastitis and Bangs almost wiped me out when I was operating with the old stanchion barn."

In New Zealand, where the herringbone parlor was invented, some of the leading dairy scientists have noted an unfortunate tendency to use the herringbone as a method for breaking speed records. They constantly emphasize proper milking procedure to counteract this racing streak in the dairymen. In one of their studies, W. G. Whittlestone, R. D. J. Parkinson, and M. J. McFetridge, also considered the problem of size of the parlor as related to efficiency. In considering both the theoretical possibilities and the actual performance on a number of farms, they concluded that a one-man parlor with eight cows to the side was the most efficient to operate under their conditions. Theoretically, this parlor could be used to milk 107 cows an hour allowing 30 seconds to change batches, 30 seconds to prepare each cow, and 4½ minutes to milk. In actual practice, they found that parlors of all sizes had a range of 54 to 91 cows per hour per man with an average of 72. It was their belief that if it was necessary to milk more than eight cows to a side in order to take care of the herd, it would be more efficient to build two separate parlors rather than one big one operated by two men.

One of the biggest stumbling blocks to smooth, fast milking, the New Zealanders found, is the occasional slow milker who holds up the entire line of cows as she gives out her milk in a deliberate, leisurely trickle. Dairymen down there have solved this problem in two ways. One is to install a spare milker at every other milking position that can be put on the slow milker when she first comes in and left on longer than the rest. A simpler and more effective method is to separate the slow milkers in the holding pen and let them into the parlor last.

These studies were made under New Zealand conditions and will not necessarily hold true for the United States. Down there, for example, they do not feed any grain during milking—or at any other time for that matter. Their climate is much milder than ours, so their milking parlors are open on the sides. Also, they are producing mainly for processing plants and their milk codes differ from ours.

The important fact is that we do not yet have careful time and motion or milking procedure studies. We need them both for the dairymen who are now building and using herringbone parlors and in refining this new tool.

Dr. W. E. Petersen, one of America's leading dairy scientists, has said: "We're planning some time and motion studies on this new system. Some of our conventional milking parlor studies, however, are applicable. We found, for example, that if a cow's first experience with a parlor was a pleasant one, she would go in easily thereafter and let down her milk better—therefore we kept the door open and let the cows wander through the parlor just eating and getting acquainted for a couple of days before we started using the parlor for milking them. Another of our findings that is of very great importance to the herringbone system is the variation in time of milking since, with herringbone, the slowest milker can hold up six to ten cows. In one herd we tested we found cows giving their milk as slowly as nine-tenths of a pound a minute and as rapidly as eighteen pounds a minute. We figured that a herd of cows made up of the fastest third of our tested herd would milk two and a half times as fast as a herd made up of the slowest third. It seems to me that we have got to start culling the slow milkers, and keeping bull records to find the bulls that are transmitting fast milking qualities to their daughters."

The herringbone system will be improved and refined, but any method that can triple a man's output is here to stay. At

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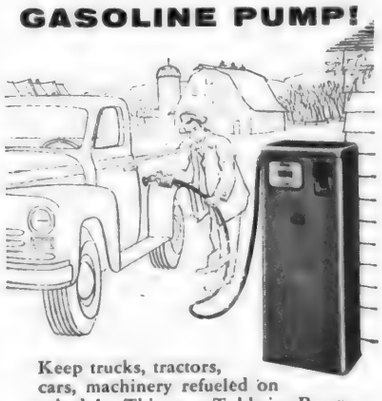

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least one competent observer, William Yaw, of the Farm Clinic, Lafayette, Indiana, believes that the development will be toward a more completely engineered, push-button type operation. This will replace rope pulling with electronic devices to open doors or operate feeding mechanisms and will certainly incorporate the automatic feed transports to fill the feeders that are already in use in poultry farms and in the hopper filling at the Curtis parlor. Improvements along these lines would concentrate attention on the cow and the quality and quantity of her milk where attention pays off.

"When we get a tool of that kind," Yaw says, "it doesn't seem economical to limit its use to a couple of hours a day. The next step, as with much of our mechanical progress, would seem to be larger operations or, perhaps, cooperative ownership of the parlor by adjoining farms."

VERTICAL INTEGRATION

(*Continued from page* 59)

ticular attention to the market, since it doesn't have a profound effect on their returns; and most of them are cushioned from loss. All they are interested in is production. And production of broilers has risen each year from 143 million in 1940 to 631 million in 1950 and on to one and

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a third billion birds in 1956 and is still growing. This, in spite of the fact that last year prices fell below the cost of production.

Jesse Jewell looks at it all philosophically, "If you're losing money on your hatchery or your growing contracts, you usually offset it with some profit on the other operations. Of course, when you lose money for a twelve-month period it's not right pleasant to take. But it teaches you to tighten your belt. On the way down we lost money at twenty cents a pound, but on the way up we made money at twenty cents. And the producer was still doing all right. The market price drop took away about fifty per cent of his income, but he didn't take a loss—all he loses is his time.

"Integration has made chicken the cheapest meat on the market," he continued. "And we *want* chickens to stay cheap. We don't want the chicken to go up beyond 20 to 22 cents because we've got people eating chicken now and we don't want them to discontinue the habit. If, through our advertising program, we could just make every family eat one more chicken a week, we'd have increased consumption by two and a half billion chickens, which is almost twice what we are producing now."

Jewell is expressing the wide-open throttle, full-speed-ahead attitude that is alarming many in agriculture. The reaction of many spokesmen for agriculture who dislike the implications of integration has been to go into integration themselves. In Georgia and on the East Coast, farmer cooperatives have stepped into the broiler picture as integrated operators—credit, feed contracts, processing plants, brand names, and all.

Co-ops Integrate Too

One of these, the United Co-operative Farmers of Fitchburg, Massachusetts, is an old organization which was started by a group of Finnish farmers back in 1927 to help them market the wild blueberries they gathered from their farms. From this start they branched out into the feed business, egg processing and selling, and finally a poultry-dressing plant. In order to keep the poultry-dressing plant operating at full capacity, the Co-op took the next step in vertical integration by going to contract growing in 1956.

They have done some experimenting with contracts and have arrived at the following arrangement: The Co-op buys the chicks from hatcheries and delivers them to the farm; they also supply all feed, grit, and medicines needed to raise the chicks; they pay taxes on the chicks and provide fire and casualty insurance on them during the period of growing. The farmer furnishes housing, litter, equipment, fuel, electricity, and labor and agrees to follow the supervision of the Co-op in raising the birds. On the sale of the birds, the raiser is guaranteed a minimum price of 19½ cents a pound less the cost of the feed, chicks, etc., which the Co-op has provided. If the market price goes above 19½ cents, the farmer gets all of the profit. If the market price falls below the minimum the loss is shared by the hatchery, which takes 25 per cent of it; the Co-op feed mill, which absorbs 50 per cent; and the Co-op poultry dressing plant, which underwrites the last 25 per cent. The Co-op's profits from feed and on the processing plant are distributed to the members in the form of a dividend; any additional surplus is allocated at the annual meeting.

Dairies May Integrate

We can no more expect vertical integration to be confined to the broiler industry than we would have thought that belt-line production methods would be limited to the manufacture of automobiles. Integration was bound to spread to any agricultural enterprise where it could be profitably applied—and it has.

Canning plants have for years formed contracts with growers for the crops they pack. In some cases, pimentos for example, the arrangements are remarkably like those used in the broiler industry. The packer carries out the research in plant breeding to produce the kind of pimento he wants; he furnishes the contract grower with seedling plants; his technicians supervise the growing of the crop; and he agrees to take the whole crop at a prearranged price when it is harvested.

New Shred-All Cutter...
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Here's another great new Gehl forage tool for faster, low-cost green-feeding! Shred-All earns its way cleaning up weeds and pastures, cutting brush, shredding cornstalks and beet tops or chopping straw and windrowed hay. Shred-All has the same rugged-built quality that has made Gehl the leading chopper among all independent makes. Available as basic unit or with choice of two deflectors for rear or side-loading. Handy tractor-seat control. See the Shred-All Cutter at one of Gehl's 2500 dealers near you.

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PRONOUNCE IT "GALE"

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INCREASE MILK PRODUCTION 20-25%
with STIMULAC
THYROACTIVE LACTATION STIMULANT

Stimulac, with thyroprotein, has now been proven right by over 50,000 cows in commercial dairy herds. When adequately supported by high-quality dairy feed, Stimulac will **increase your herd profits** by increasing milk production 20-25% and butterfat test 2-4% without increasing overhead.

To find out how you can use Stimulac to increase your herd's milk production, write Agri-Tech at the address below. Ask for special chart showing the extra profits possible from your herd.

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Agricultural economists at the Griffin Experiment Station of the University of Georgia recently held a seminar to discuss the kinds of farm products that might fit in with integration. Perishability, they felt, would be an important factor. Any crop which could be cheaply and safely stored would be a hard one to fit into an integrated program. Farm products to which specialists can add value by advanced preparation before they reach the producing stage might be another key to integration. Examples of such preparation would include such things as producing breeding stock and hatching eggs, growing heifers to the point of milk production, growing hybrid seed, or producing feeder animals. Another requirement would probably be the need for processing before the product could be consumed. They also felt that when you combine perishability and the need for processing you get a need for a continuity in the flow of production and marketing that also lends itself to integration. Another factor that would centralize management and control would be the requirement that processing be somewhat near to the point of production.

When you put these factors together, a number of farm enterprises seem to fit the picture. One of them is dairying. "Add one technological factor on which a lot of work is being done—preservation of whole milk—and the whole dairy industry might be ripe for vertical integration," one of the economists remarked.

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20% BETTER

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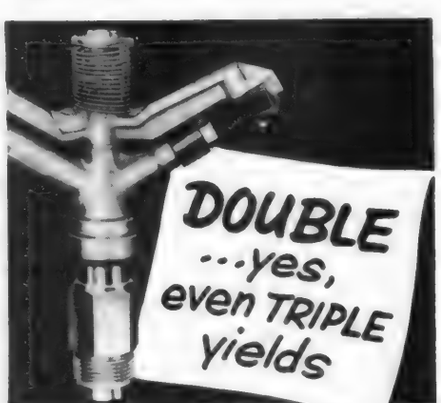

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While these theoretical concepts indicate the direction which integration may take in the future, this new economic organization of agriculture is being applied with surprising speed to a number of farm products today.

Lease a Sow Herd

In various parts of the country, feed manufacturers and others are studying the possibilities of applying vertical integration to hogs, beef cattle, and laying flocks, and a few of them have jumped in and are doing it. One of those, a Midwest feed mill, began putting gilts and boars out on a lease basis three years ago and is now pushing production at four breeding centers trying to keep up with demand. "I feel like a traitor to my profession," the advertising manager of this concern said, "but we must request that you leave our name out of the story. We will tell you and show you everything about the operation, but we are not able to keep our salesmen supplied with gilts and we'd kick up a real storm if we got more than word-of-mouth publicity on the program right now."

Capitalizing on the growing demand for meat-type hogs, this concern hired a geneticist and began building herds of inbred hogs which have been developed for their meat conformation, their economical conversion of feed into pork, and the hybrid vigor they will pass on to their offspring.

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As soon as they had built a supply of breeding animals they began putting them out on farms in lots of 11 gilts and 1 boar of breeds that cross well.

Here is the deal they offer the farmer: The company agrees to deliver to the farm one or two lots of gilts and boars which are guaranteed to be vaccinated for cholera and erysipelas and blood-tested for brucellosis and leptospirosis. All stock is accompanied by a health certificate showing that they have been examined by a licensed veterinarian and are in good health. The company also agrees to furnish supplemental feeds from breeding to market with no interest charge for this financing. The company also provides supervision in the raising of the pigs and agrees to assume all losses due to death or to non-breeders unless the death losses are caused by negligence on the part of the producer.

The farmer agrees to pay a small service fee for inspection and service on the animals. He also agrees to use the company's feeds as long as the animals are on the place and to follow the management program recommended by the field man. He keeps the breeding stock for two litters to fulfill the contract, but he is permitted to withdraw from the contract on reasonable notice. At market time he pays for the feed he has used in raising the pigs and pays for the use of the breeding herd by allowing the company's representative to select a share of the progeny which usually comes to 1/10 of the total pigs produced. After weaning the second litter he agrees to keep the sows until they are dry and in marketable condition and then turns them back to the company. All pigs, except the gilts used to pay for the lease of the breeding stock, are considered to be the property of the farmer and he may market them as he wishes.

With such a program in full swing, the company then started a boar leasing program which is along the same line as the other. The company supplies the boar and the supervision; the farmer agrees to use the boar only on his own sows and to pay for the boar by sending the company a check for an agreed amount of pork when he markets the first litters and to pay for the feed he has bought. The boar remains the property of the company and, if the contract is continued, is replaced by another boar of a different breed selected by the geneticist to cross with the gilts sired by the first boar.

When the program was started, the company assumed that their major customers for the sow lease program would come from young farmers who needed more capital to get a start. It has not worked out quite this way. As one owner of 500 acres of rich Iowa farmland said, "Why should I run the risk of death losses and nonbreeders and have money tied up in a breeding herd if they will do it for me? Their feed is no more expensive than others and their management practices are completely sound—I'd be following them anyway."

The results that have come from this program have been, one gathers, surprising even to the company. After three years, their sow-lease program is making them money on a straight livestock basis without considering profits from feeds sold and their boar-lease plan is just about breaking even—which is probably all that it ever will do. As for feed sales, they have jumped over 40 per cent in the six months. "The lease programs are the only thing we can credit for boosting sales so phenomenally," the company's general manager said.

With this kind of record, and with the poultry business as an historical guide, one can only conclude that this is just the beginning of integration in swine. The company sees the development of a marketing system as the next step. "The producers on this program are turning out high quality, meat-type pigs," the general manager said, "and we should be able to develop a mar-

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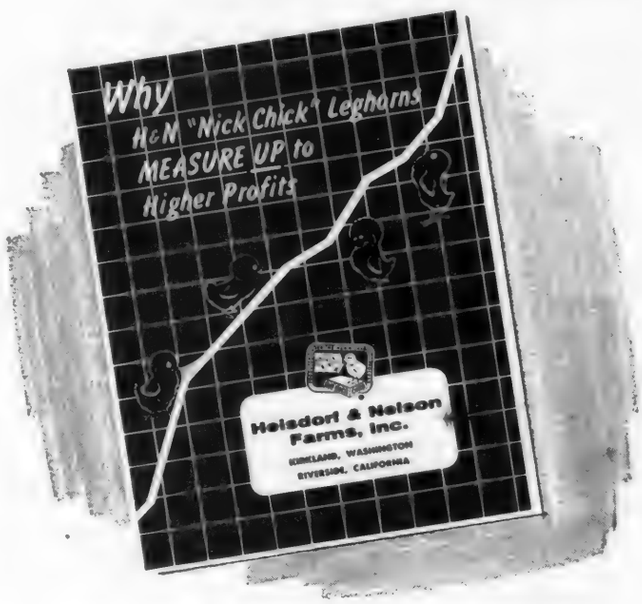

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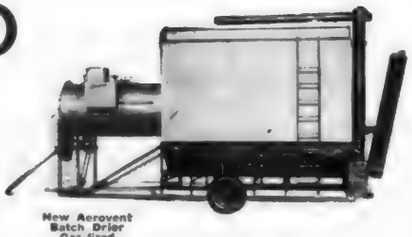

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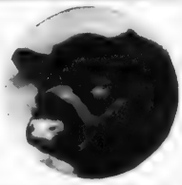

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increase **weaning weights 50 to 100 pounds . . .** ***increase*** **calf crops 10 to 15 per cent . . .** ***increase*** **yearling weights 100 to 200 pounds . . .** ***increase*** **mature cow weights 100 to 200 pounds . . .** ***increase*** **grazing efficiency and traveling ability . . .** ***increase*** **milk in replacement cows . . .** ***increase*** **resistance to heat, cold, pink-eye, cancer eye and other infections . . .** ***increase*** **carcass value . . . and finally,** ***increase*** **market returns by bringing higher prices for weight.**

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keting arrangement that would pay extra for that kind of animal. That, I think, will be the direction of our development."

An economist, looking at this particular situation, commented, "You have here the elements that would make possible a radical change in the swine industry. This company controls the breeding stock necessary to produce uniform, highly marketable pigs. They have contracts with around a thousand good hog producers who use these gilts and boars. Suppose that they got a couple of hundred of their best farmers to become specialists in feeder pig production. They would then have a supply of uniform, meat-type pigs which they could put out for contract growing just as the feed dealer in the integrated broiler industry does. With a quarter of a million of these good pigs, they would be in a fine bargaining position or even in a spot where they might want to go on into processing themselves."

The Midwest company is just one of many feed and packing companies that are feeling their way in this direction. The big Ralston Purina Company has certainly taken a step in that direction with its pig-parlor, swine management program and with the credit which some of its dealers extend to farmers.

In the west, a different form of vertical integration has been established in the beef finishing field. Here the feed company has taken over the function of the farmer completely by establishing giant feed lots on its own premises. In this case, the cattle are shipped to the feed lot and are fed out under contract. Most of these companies have pushed still further the integrated operation by producing, on their own ranches, a large number of the cattle that go through their own lots. A description of one of these operations is given in the article, "Super-sized Feed Lot," THE FARM QUARTERLY, Spring, 1957.

What Makes Integration Tick?

The factors which are causing the dynamic growth of integration and which are increasing production while lowering the unit cost are many. Most important is probably the securing of credit at reasonable rates. A bank can extend substantial credit to a feed dealer with a sound supervisory program, who is also backed up by a feed mill, at much lower rates than it could loan an equal amount to a large number of individual farmers. With a loan to a feed dealer, only one account need be serviced, whereas each farmer account must be supervised, a costly procedure, and each of them is a greater risk than the dealer loan.

The bulk handling and the constant, predictable flow of feed reduces the cost to the dealer. Along this same line, the elimination of seasonal peaks and lulls in both the feed mill operation and in the running of the processing plant reduces both the fixed costs and the cost of labor.

And finally, from the point of view of the operator of the integration, mass production in growing or breeding stock tends to increase uniformity and give quality control which makes his selling job easier. He is, after all, dealing with chain store buyers who are also part of a highly integrated operation and who want a constant supply of a uniform product for their retail outlets.

From the producer's point of view, such an arrangement reduces the risk of loss and also the cost of getting into farming. This is of sufficient value to many farmers that they are willing to trade their opportunity for greater profits, some of their freedom to farm as they want, and the value of their training and experience for no-risk farming.

One thing that integration seems unable to do is to curtail production to fit demand. Competition in the broiler industry, for example, has brought about sharply increased production during the past two years in the very teeth of falling prices.

Farmers and farm leaders are not taking an impersonal, detached attitude toward this new development. While it has not yet spelled out its position on vertical integration, the American Farm Bureau Federation is studying it with grave concern. Integration, they feel, presents both problems and opportunities.

D. Howard Doane, the dean of American farm managers, has written, "The impact of this new financing arrangement upon agriculture is so great that it may

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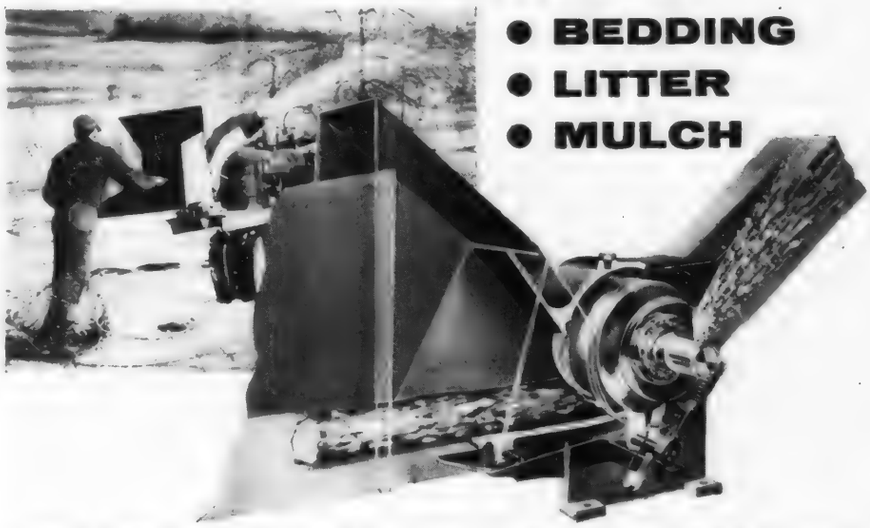

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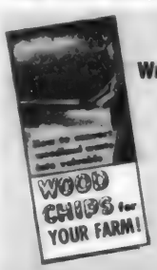

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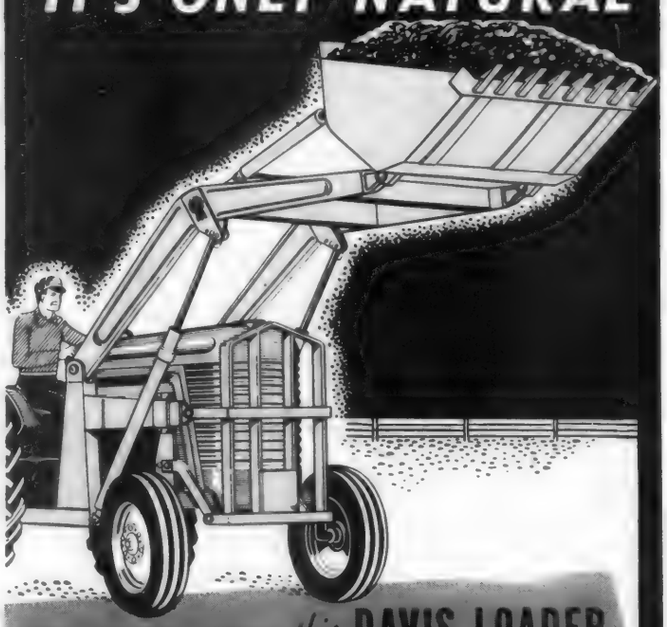

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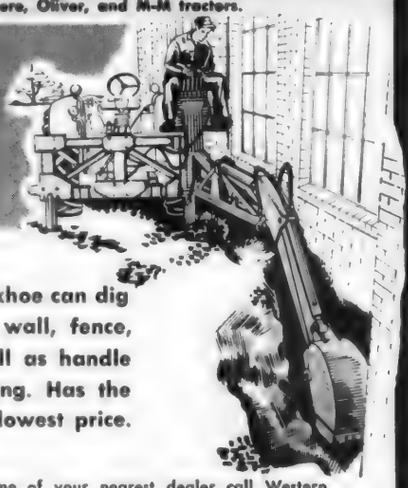

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completely revolutionize the production of animal products. . . . The time is approaching when most agricultural products will be produced under contracts of one kind or another."

"Vertical integration controlled by middlemen puts farming at the bottom of the pyramid," James Patton, President of the National Farmers Union, said recently. "If the food business is to be vertically integrated, the heart of the matter is whether it will be controlled for the benefit of farmers and ultimate consumers or for the benefit of a comparatively few corporations."

Farmers in the broiler industry have found that bucking integration is about as effective as trying to change the direction of a hurricane with a palm-leaf fan. What, then, is the fate of the farmer in a segment of the industry that is being integrated; become a piece rate worker? Three alternatives are being given consideration.

Some groups are urging government control of integration and watched with interest the hearings held by the Small Business Committee of the House of Representatives which looked into integration early this summer. No recommendations for new laws have come from this committee since the hearings were admittedly exploratory. There is, understandably, considerable opposition to more government controls.

Labor has shown that when it comes to negotiating a contract, group action is more effective than the bargaining power of the individual. And there is some consideration being given to organize farmers into trade-union type groups to bargain collectively with the integrator—the feed company, processing plant or other integration organizer—on the terms and conditions of the growing contract. This alternative seems to accept for the producer the role of piece rate worker and to try to make the most of it. Such a move is a distinct departure from traditional farm thinking.

The third alternative is already in operation by a few farmers' cooperatives who are seeking to out-integrate the integraters. "The real question," they say, "is who owns the integration—the farmers or the feed mills. We plan to be the ones in the saddle. With farm prices slipping and costs to the farmers going up, his position in the national marketplace is critical. We think that it will take a bold solution like vertical integration to use as boot straps for some self-help pulling."

SOWS THRIVE ON SILAGE

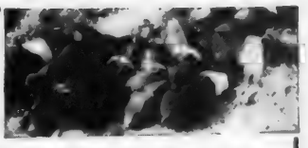
(*Continued from page* 75)

out for corn silage could be used for sorghum silage, grass silage should be supplemented with a special balancer that is lower in protein but higher in carbohydrates. Such a ration, worked out by the University of Minnesota, is shown on page 75.

Results

There are at least three different ways to judge the results of silage feeding: cost, number of pigs born, and number of pigs raised. Tripp figured that he had saved between 30 and 40 per cent of his usual cost of producing a pig; Catron places the saving at a more conservative 20 per cent; while at Purdue University in Indiana, research workers have placed the savings at around 10 cents a pig. In numbers of pigs farrowed, Catron was able to compare rather large groups of sows which had been fed under two systems. One group of 231 sows and gilts had been self-fed a complete, bulky ration in 1954. They averaged 9.4 pigs; 50 of them farrowed small litters—from 2 to 8 pigs per litter. The following year, they hand fed 186 sows and gilts following the recommended corn silage feeding methods. These sows and gilts averaged 11.3 pigs per litter with only 4.4 per cent stillborn; only 4 of the 186 sows farrowed litters of fewer than 8 pigs.

The information on pigs raised which Purdue University has compiled, emphasizes one of the important aspects of silage feeding—sow condition at time of farrowing. The Purdue scientists tested silage-fed sows against sows fed a conventional gestation ration. At the time of farrowing, the sows which had been silage



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fed were noticeably trimmer. They farrowed 10 pigs per litter as against 9 for the conventionally fed sows, but the real difference showed up later. Both sets of sows were put on the same lactation ration after farrowing, but the silage-fed sows proved to be the best mothers. They raised 8.5 pigs out of the 10 farrowed as compared to 6.6 pigs raised by the control group out of the 9 pigs they farrowed. J. A. Conrad, a Purdue nutritionist who worked on this problem, explains, "The heavier control sows stepped on more pigs and laid on more of them than the sows which had been kept lighter through silage feeding. Sows use only about a third of their digestive capacity to take in all of the nutrients they need during this gestation period; if they are allowed to fill up on more concentrated feeds, they are bound to take on more weight than they should."

Silage for Lactation and Finishing?

No one has done any experiments with silage feeding of growing and finishing pigs or of lactating sows. Conrad, of Purdue, doubts the value of such experiments. "As I mentioned, during gestation a sow is using only about a third of her digestive capacity, but during growth and finishing and during lactation all of the digestive capacity of the animal is put to use. During these times filling them with fiber will slow down the rate of growth or will cut down on the milk flow. A good deal of work has been done on this problem in Europe, so we know what to expect. Here in the Midwest it would seem foolish to deliberately slow down the rate of growth by substituting silage for corn."

In considering the value of silage and the savings it can make in feed costs, it is always assumed that the silage is being made in large quantities and that it would

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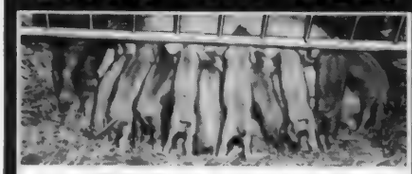

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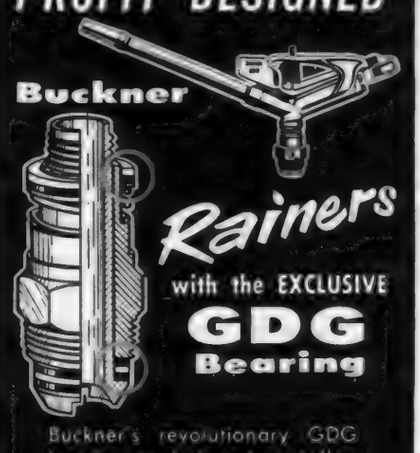

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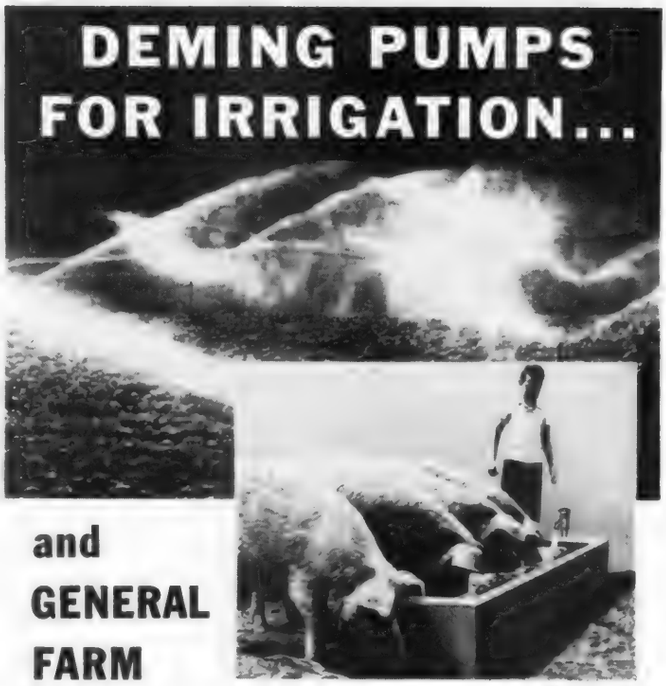

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be made for the cattle on the farm anyway. The value of silage made for sows only is quite a different problem. Many cost-conscious farmers would quickly answer that it wouldn't pay. Others point out, however, that by using plastic covers and having the silage custom harvested, small batches of silage might be put up at a cost that would still make it attractive. In estimating the amount of silage that will be needed, you can figure that if a sow is on a flushing ration of silage for four weeks before breeding and is on silage for the 112-day gestation period, she will consume a maximum of a ton of silage. Another way of looking at it is that four sows will eat as much as one milk cow—but only during the flushing and gestation period.

One of the old superstitions that has kept many farmers from feeding silage is the belief that if a sow eats spoiled silage she will promptly roll over and die. Though all of the research workers urge the making and feeding of the best silage, they all debunk the idea that a mouthful of spoiled silage is fatal. As a matter of actual fact, it would be hard to find out whether it is or not for a sow just won't eat the stuff. When she comes on silage that is spoiled, she just roots it aside and goes on eating the good silage for that well-fed feeling she craves.

THE VERSATILE FARM SPRAYER

(*Continued from page* 70)

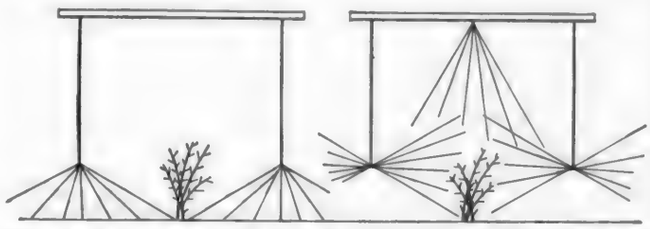
In areas of the Midwest where rootworms are a problem, sprayed applications of insecticides can be used just as effectively as granular forms, with the added convenience of the ease of handling liquids. In his work with rootworms, Dr. J. H. Lilly, of Iowa State, points out that the work in Iowa has shown that approximately one pound of aldrin or heptachlor in emulsifiable form, mixed with 5 gallons of water, applied per acre gives good control. The application can be made from planter mounted sprayers designed to spread a narrow band of insecticide just back of the planter shoe. Or a broadcast application of the liquid insecticide can be sprayed on with liquid fertilizer, or as straight material mixed with water. In the broadcast application, the insecticide should be disked into the ground as soon as possible.

The next step in the corn program normally is corn weed control. Pre-emergence weed sprays of Geigy's new "Simazin" have given excellent results in Missouri tests in 1957 according to Stuart Spradling, Research Director of the MFA Oil Company. The second shot at the weeds is with 2,4-D when the corn is two inches tall, using a fan-type nozzle that will apply 10 gallons of mixture at 30 pounds of pressure traveling at four miles per hour. This should be the minimum gallonage per acre. The fan-type nozzle makes it possible to apply a more even coverage over a given swath between rows; whereas the cone-type nozzle is designed to give a whirl-type pattern which is more suitable when trying to spray inside a bushy-type plant for insect control. After applying the 2,4-D on a broadcast basis on the young corn it should not be cultivated for at least one to two weeks in order to allow the 2,4-D to do its killing job.

Another method of weed control in corn, especially when there are hard-to-kill weeds present, is to spray 2,4-D on the weeds when the corn is ready to "lay by." At this stage of growth, corn is not easily injured by 2,4-D even when larger quantities are used. Hard-to-kill plants, such as Canadian thistle, should have good plant growth on which 2,4-D can be applied in order that enough 2,4-D can be absorbed by the leaves to cause the root system to be damaged. Also, when 2,4-D is applied at the "lay by" time the farmer can be sure of clean corn at picking time.

To control corn borer, the farmer must spray his corn at the right time and get a thorough application. Normally, when the corn is around two feet tall the first generation of corn borer starts. The upper part of plant and the whorl must be inspected daily. When the farmer can count about 50 egg masses in a 100-foot row of corn, he should spray immediately. One and a half pounds of DDT in 15 or more gallons of water is used per acre. If the farmer waits a little too long to spray, a certain number of

the worms will be down in the whorl of the corn. The problem then is to get enough spray material down into the whorl. To do this a large cone-type nozzle must be used in order to have large enough droplets and enough water to cover the inside of the whorl. The minimum size nozzle, using one over each row, should be a nozzle that will put out at least 15 gallons of spray mixture per acre at 75 pounds pressure traveling at four miles per hour.



Using boom drops to (left) spray between rows with a herbacide, and (right) to spray the rows with an insecticide.

The second generation of corn borer usually comes along when the corn is in the tasseling stage or near ear-making time. At this time the moths lay the eggs on the underside of the leaves around the ear zone. When this happens it is necessary to place your nozzles so they extend down on each side of the corn stalk where the spray is applied at the ear zone. Usually two nozzles per row is adequate. Two nozzles per row that will put out 20 gallons of spray mixture at 75 pounds pressure traveling at four miles per hour should be the minimum size used. Again, DDT is used.

The corn insect problem most important in sweet corn production is the control of the ear worm. Ear worm control requires a timely and accurate application job. Again, using somewhat the same method as for corn borer, put one nozzle on each side of the corn ear, direct the nozzle at the silks. Plug the nozzle opening above the row. Two nozzles that will apply 30 gallons of spray mixture at 75 pounds pressure traveling at four miles per

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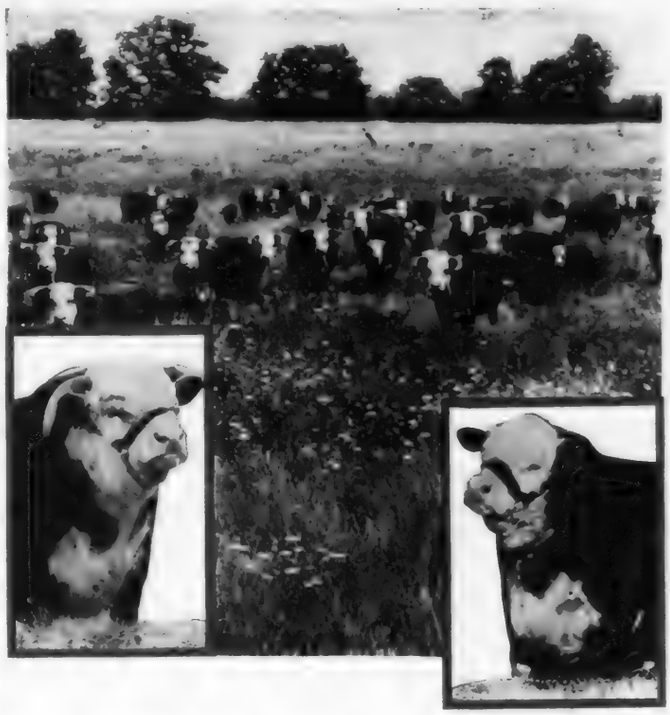


Every cowman knows the love of good cattle is something that "gets in your blood." Herefords are that kind of cattle. As the predominant beef breed in all America, their beauty, beefiness and profit-making ability have won the esteem of more practical cattlemen than all other beef breeds combined.

White-faced, red-bodied Herefords are known for prepotent, aggressive bulls; dependable, thrifty cows; and high percentage calf crops. They are a breed that thrives anywhere, gains more in pasture or feedlot, and tops the nation's markets 82 percent of the time.

Herefords have proved themselves in all the tests — on the range, on the farm and in the feedlot. No wonder they are the Cowman's Cattle — *the Grand Champions of PROFIT.*

Whiteface Bulletin

In the 1956 carcass contest at the International Livestock Exposition, Herefords topped the entries with an average loin eye area of 11.62 square inches. This was 1.67 square inches larger than the average of another major beef breed.

Thus, when it comes to measuring well-marbled red meat — and particularly in the steak department — the facts prove Herefords lead them all.

THE AMERICAN HEREFORD ASSOCIATION
DEPT. BQ — HEREFORD DRIVE — KANSAS CITY, MO.

Free booklet . . . "HEREFORDS top them all." A colorful booklet that tells why Herefords are Grand Champions of *Profit*. Send name and address, today!

HEREFORDS
More calves . . . more pounds . . . more profits

hour should be used as the minimum gallonage. Start spraying for ear worm control when about one per cent silking is evident and continue spraying every three days until the silks turn brown.

For spraying corn, the proper time and application, the proper placement of nozzles, with adequate use of water, are the keys to better corn and more corn.

Cotton Pays For Spray

The amount of spraying materials and equipment needed to raise a cotton crop has caused one Missisippi general store loafer to remark, "Used to be, a fellow with a mule, a plow, and hoe could raise cotton. Now, best thing for him to do is join the Army and learn chemical warfare first."

With the boll weevils on a 7-day schedule, and boll worms working when the weevils aren't, the cotton farmer in 1957 who wasn't equipped to do his own spraying ended up with one of the saddest crops in history. From the pre-emergence sprays for weeds to the defoliating sprays in August and September, many a good grower will make 18 to 20 spray applications. The spray applications, costing 85 cents to $1.25 per acre (with chemicals), pay off handsomely, often with ½ to 1½ bales better yield.

Farmers discovered in 1957 that good kills were coming from using more water and getting the nozzles set for accurate application to get complete plant coverage.

First Choice for Irrigation

...CONTINENTAL RED SEAL POWER

The formal start of pumping from this well, one of 27 owned by the Pioneer Irrigation District, was big news to the farmers of the Caldwell-Nampa area in Idaho. As the first irrigation installation in the state to operate on natural gas, it ushers in an era of lower-cost irrigation power . . . A Continental M-330 drives a Layne-Bowler turbine pump with a 74-foot setting in a 120-foot well. In the demonstration run, speed was increased gradually to 1,800 rpm., boosting the flow on open discharge to 2,700 gpm. . . . The Continental line includes models designed for use on all standard fuels, and engineered to the needs of every type and size of irrigation job. On farm and ranch, as in other fields where dependability counts, your best buy is famous Continental Red Seal power.

WORLD'S LEADING INDEPENDENT MANUFACTURER OF INTERNAL COMBUSTION ENGINES, CONTINENTAL MOTORS OPERATES PLANTS IN ATLANTA, DALLAS, DETROIT, MILWAUKEE, MUSKEGON, AND TOLEDO, AND IN ST. THOMAS, ONT., PRODUCING AIR-COOLED AND LIQUID-COOLED ENGINES FOR USE ON LAND, AT SEA AND IN THE AIR.

CONTINENTAL ENGINES ARE BACKED BY FACTORY-APPROVED SERVICE AND GENUINE RED SEAL PARTS ALL OVER THE WORLD

Continental Motors Corporation
MUSKEGON • MICHIGAN

INCREASE FARM PROFITS!

KILLS CORN BORERS by pulverizing, mulching and firming soil on cornstalks that have been plowed under — corn borers are smothered in ground. Saves time, labor, horsepower, preparing ideal seedbed. Leaves surface mulch without grooves to help prevent washing. Seedbed conserves moisture — more seeds grow. Helps increase yields of all crops. SEEDBED MAKER has 3 in 1 Combination spring tooth harrow, sprocket packer and mulcher with seeder available. Once over your plowed field with this machine does the ideal job. Write today.

TRAILER MOUNTED FOR POWER TAKE-OFF. Has traveling feed table. Especially designed for grinding or chopping larger quantities of loose or baled hay and any roughage. Comes with or without Trailer Mount and P.T.O. Both cutter knives and heavy swing hammers. Grinds any feed, wet or dry, snapped or ear corn, roughage bundles or baled flakes with farm tractor. Write for details.

WESTERN LAND ROLLER CO., Dept. FQ-37
Hastings, Nebraska - Manufacturers

To lick the old problem of spraying lickety-split for an hour, then sitting around for two hours while the sprayer tank filled up with water, many farmers were buying up old 1000-gallon gasoline tank trucks and equipping them with high speed centrifugal pumps driven by an aircooled engine. With this outfit the whole mixing and filling schedule was speeded up. Ninety gallons of endrin was put in the tank and the 900 gallons of water was pumped in at night. Then the sprayer filling was from the tank truck in the field. A 250-gallon sprayer tank could be filled in 10 minutes.

One cotton farmer, A. O. Craig, of Wilson, Arkansas, down in the Delta country, analyzed it this way: "If we can save one boll per foot by spraying, I can pay for 14 spraying applications; as it turns out we're saving several bolls a foot from the insects. One boll per foot will figure out to be worth $15 per acre. Many people around here figure they can spray for 85 cents an acre with the chemical included. We get our best results with a sprayer nozzle that will put on 15 gallons of the mixed spray an acre, using 40 pounds pressure and 4 miles per hour travel."

One of the most spectacular boll weevil kill stories came from Robert Jackson of Route One, Tyronza, Arkansas. He says, "We had been fooling around with airplane sprays in the early summer. We were getting the spray material down just about a foot into the leaves of our 5-foot cotton with about 50 per cent kill. We bought a Hahn Hi-Boy in August and a week later we began checking the dead boll weevils and live boll weevils in our cotton. As far as I can see, we are getting 100 per cent kill. With our 7-foot cotton in September we are going to need this high clearance machine to put on our defoliant. We are going to use 'Folex' this year."

A cotton spray program that has paid off in the Delta cotton country is as follows:

(1) Before planting, a complete liquid fertilizer application, tailored to fit soil test requirements is sprayed on. This is worked into the soil with a disk.

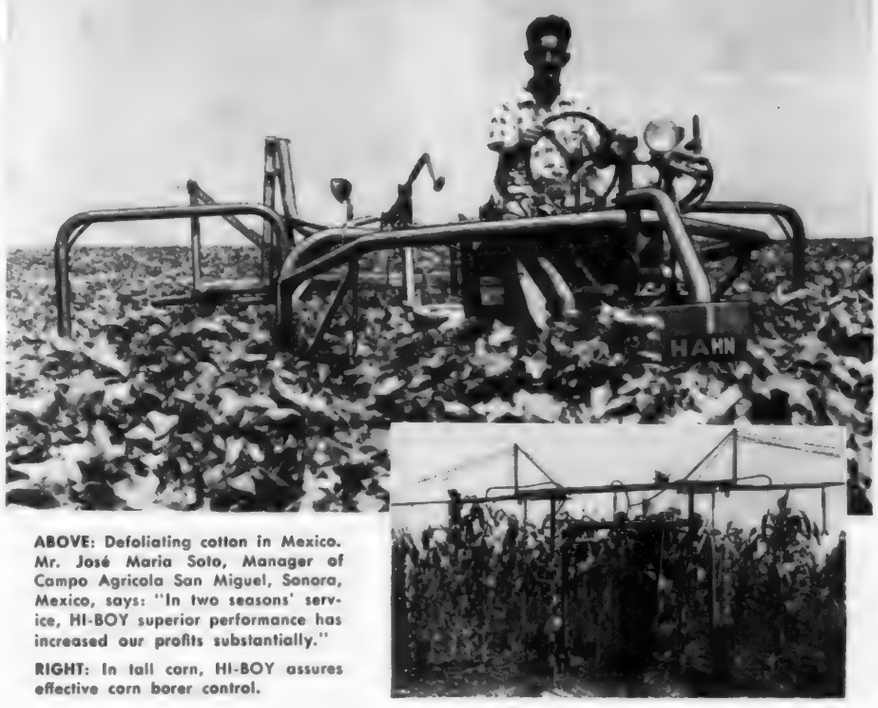
(2) After planting, a pre-emergence weed and grass control spray is used. Good control has been obtained from using Dupont "Karmex." This spray is placed in bands along the seed row as soon as possible after planting, the objective being to eliminate a lot of hand hoeing.

(3) When the cotton pops through and is at the 2-leaf stage, get the sprayer greased and gassed for there is spraying to do for the rest of the summer. To get the flea-hoppers, thrips, aphids, and other leaf eaters, a spray every week for four weeks will be needed. Toxaphene is the basic material, applied at the rate of one quart in 10 gallons of water to the acre.

(4) It's boll weevil time when the cotton begins to bloom and because this ornery insect can damage the bloom, the square, or the boll, you have your work

Keep on Top of Crop Protection

WITH A SELF-PROPELLED **HAHN HI-BOY** SPRAYER-DUSTER



ABOVE: Defoliating cotton in Mexico. Mr. José Maria Soto, Manager of Campo Agricola San Miguel, Sonora, Mexico, says: "In two seasons' service, HI-BOY superior performance has increased our profits substantially."

RIGHT: In tall corn, HI-BOY assures effective corn borer control.

Offered in 4 farm-proved models . . . ranging from 8¼ H.P. through 26.8 H.P. . . . more HAHN HI-BOYS are in use than all other makes of high-clearance sprayers combined! Used with the new HI-BOY Topping Attachment, plus other specially engineered accessories, today's most versatile high-clearance sprayer gives you still greater value from the most profitable equipment investment you've ever made. Send coupon below for full details on HAHN Sprayers to fit every farm's needs.

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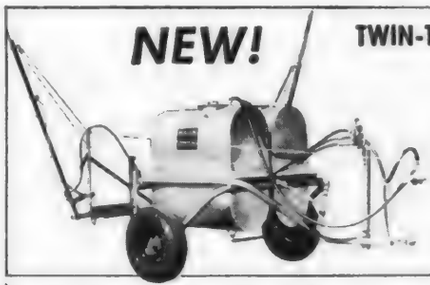

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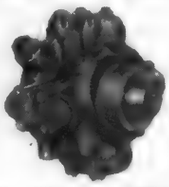
BLUE Trailer Sprayer

Costs only a little more than tractor mounted sprayers—but so much more useful. Row clearance 38" adjustable wheel treads to 80", convenient control and sturdy hitch. Folding boom and a wide choice of nozzles.

BLUE "Quad" Pump



A high quality, precision pump for low and high-pressure general purpose and row-crop spraying. Has four pistons and is self priming. Also available is the BLUE "Twin" pump with two pistons.

BLUE Chemi-Spreader

Most versatile machine ever designed for liquid fertilizer. Can be rigged for any use —non-pressure, low pressure; corrosive, non-corrosive; surface or sub-surface applications. Wide choice of tanks, booms, drives, etc.

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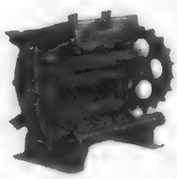

Available in 6, 8, 12 or 16 hose models for application of non-pressure and low pressure liquid fertilizers and nitrogen solutions. Low priced. Easily mounted on planters, tool bars, trailer rigs, etc.

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BLUE LINE PRODUCT

cut out for you. Apply a spray every five days, for 6 to 12 applications. Right at this time the boll worm turns up, too, and the sprays are designed to get both pests. Rates of application for the following chemicals vary, but it is around one quart to 15 gallons of water per acre. *Be sure to use plenty of water.* Water gives coverage. Endrin, toxaphene, BHC, dieldrin, malathion, parathion, are effective against both insects. DDT is for boll worms. A mixture of DDT and toxaphene is often used. Most farmers rotate several of these chemicals. Keep these sprays going until you are ready to spray the defoliant and do the last picking of the season.

New and Different

A sprayer can be used to feed liquid fertilizer into a surface irrigation ditch. The tank is filled with a complete type or a selected formula. The entire irrigated area can be covered if the fertilizer is fed in the main ditch, or selected fields can be covered by feeding into laterals. There is some fertilizer loss in the ditch area, naturally. The best use of the sprayer for liquid fertilizer application is with a sprinkler irrigation, for the field is covered evenly. The fertilizer solution can be pumped into the main supply pipe directly after it leaves the pump through a removable plug.

The fertilizer is pumped in at an indicator pressure of 10 pounds or so higher than the pressure in the irrigation line. If this injecting is done immediately after the pipe is moved to a new location for 10 minutes or so, the rest of the irrigation serves to flush out the pipe and sprinkler heads and wash the fertilizer into the ground.

Sprayers filled with water can even be used to dig post holes. Fasten a five-foot length of galvanized pipe to the end of a length of sprayer hose. Then turn the pressure up to 150-200 pounds. The pipe will bury itself in the ground, making a mushy hole as deep as you want it. This same technique can be used for planting seedlings, or young trees. You can be sure there are no air pockets around the roots when they are set in this manner.

Farming with Chemicals

Artificial moons were comic strip pipe dreams a few years ago. It isn't wishful thinking to look at the future of farming and see weeds and insects as something that the farmer can control at the time of planting—for the rest of the season. In August, 1957, Dupont's Dale Wolf, speaking before the ASAE, said, "We have always taken it for granted certain crops should be sown in rows . . . now, however, we have progressed to such an extent that the day may be not far off when crops will come through the entire season without any weed control operation being necessary. Then it may be more productive to sow row crops in some other pattern. And perhaps instead of

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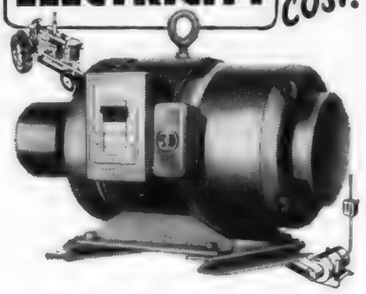

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For farms with frequent power failures, Onan builds gasoline-engine-driven electric plants from 500 to 75,000 watts.

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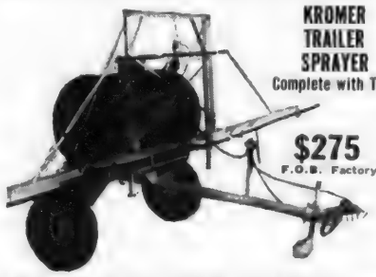

You get double duty from KROMER Power Sprayers because they handle chemicals for weed and insect control and liquid fertilizers too! Spray better, faster, easier, with America's finest power sprayers.

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row pickers for crops like corn and cotton, we will have combines . . . in the control of insects and plant diseases we are moving toward systemic protection, which is really the creation of immunity within the plant by the use of chemicals.

JUDD McKNIGHT BUILT A SHEEP KINGDOM

(*Continued from page* 55)

sack of beans in trade to the Mexicans living along the Hondo River to the north.

Judd became a father in 1912. It was a boy and they named him Joe. When Joe was old enough to go to school Judd and Nannie moved to Roswell and built a two-story house.

Judd hired a bookkeeper, but the five-dollars-a-day wage was big money to Judd, and he fired him and made up a system of his own. It was simple—he set his bills down on one side of the page and his income down on the other. He hired a surveyor for five dollars a day but the surveyor made a mistake in a section line and Judd fired him, too. He bought a transit and learned to do his own surveying. He was good enough that he was often called upon for his expert knowledge of land boundaries in Lincoln County.

Judd's appetite for land knew no restraint. He kept buying, going heavier and heavier in debt. The Home Ranch grew up to 70 sections, but he owed $300,000. One day his banker asked him, "Why don't you stop buying land? You've got enough to make your living. You can always buy more some day when you get money ahead."

Judd shook his head. "They may grow big corn crops in Iowa, big wheat crops in Kansas, and big lamb crops in New Mexico. But there'll never be another crop of land. Some day land will be hard to buy."

Judd's family kept pace with his land and his sheep. After Joe came Minnie, J. P., Joyce, and Wade. Between Minnie and J. P., they lost six.

Then in 1917 came the great drouth. With fourteen thousand sheep on hand, with grass burned up, with waterholes and rivers dry, Judd didn't think he could last thirty days. But he wouldn't let go. He ranged his sheep a hundred miles north and south of the Home Ranch, and kept his wary eye on neighbors whose land and sheep were on the line. The bankers urged the ranchers to sell out before they went broke. Judd put up a big front. "My grass is fine," he said. Got lots of it." The poor forage kept his ewes from breeding that fall and the next spring he didn't raise over a ten per cent lamb crop. However, he kept his breeding herd together and was still in business when the rains came the next year. In 1920 he sold 9,924 head. It was the proudest day of his life

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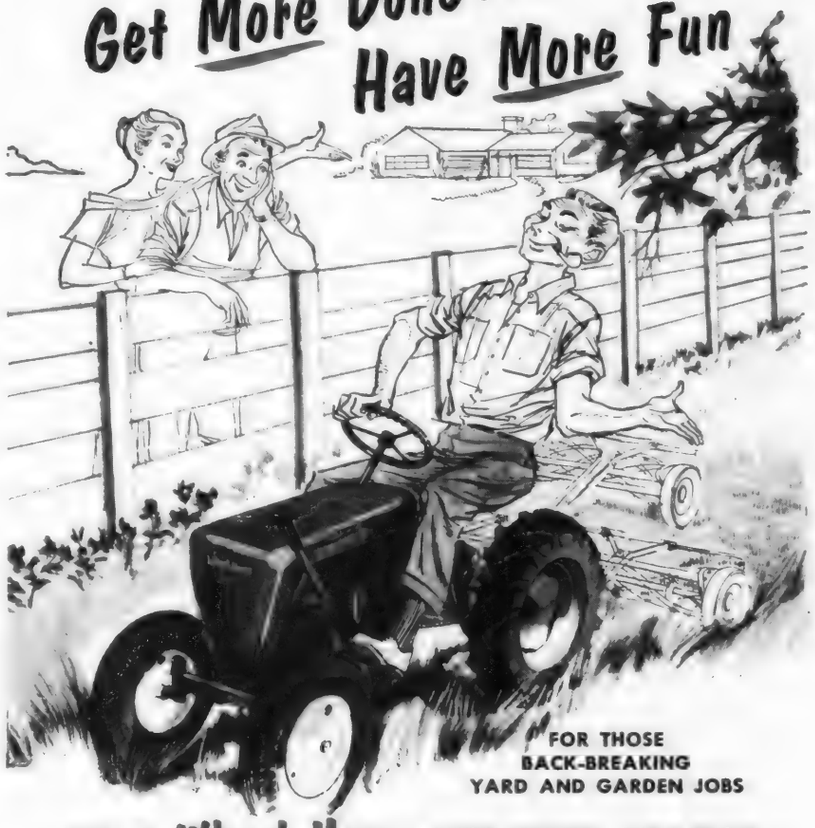

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Fun begins with solid comfort the moment you ease into the driver's seat. Set off at 6 mph in high . . . 1 mph in low. You'll find the all-new streamlined Wheel-Horse shifts, corners, backs, and stops with power response of a big tractor. It's the only yard tractor with automotive gearing, steering, and two-wheel brakes *as standard equipment.*

Take all jobs in stride with pull-power to spare! Solid weight of the all-steel body, and oversize 6:00 x 12 tractor-type tires provide plentiful traction for terraces or hilly ground. Fully guaranteed. Your only problem is with envious neighbors!

Start now to have fun . . . and get more done in one-third the time on a Wheel-Horse yard and garden tractor. See your nearby dealer today for a free tryout, or write direct. We'll forward his name with detailed color brochure giving complete specifications.

3½ ft. snow plow makes fast work of clearing long drives.

Select from 22 attaching tools including this self-dumping trailer, rotary and reel mowers, lawnsweep, fertilizer spreader, garden plow and cultivator.

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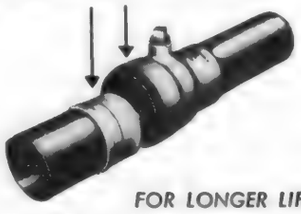

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when he and Joe and his herders drove them through Roswell to the stockyards on the east side of town. The stockyard pens couldn't hold them all and they had to be grazed out on the East Grand Plains where irrigation from artesian water was just beginning to excite residents of the Pecos Valley.

He seemed to be free and clear at last. But he wasn't. In 1923 drouth visited again. He had lots of sheep, was hiring forty herders. Markets were glutted with sheep. Prices broke. Judd knew he was going to have to change his methods of management if he stayed in business. Too many times drouth had threatened to ruin him. One day a neighboring rancher came by to sing the blues. Judd snorted. The drouth wouldn't last forever. The ranchers who outlasted it would be in a strong position to make money and pay their debts. "Besides," he said, "I've got a plan that will let our sheep make better use of range and water. Best of all it'll cut our herding costs to nothing."

The First Fence

The next day Judd went to see Abe Pruitt. "Abe," he said, "I want you to buy me enough wire to fence my land. I can turn my sheep loose and they'll range into country that has never been grazed."

Pruitt thrust his hands into his pockets and pursed his lips. Finally he said, "It'll never work. Coyotes will eat you up. You will go broke."

Judd said quietly, "I owe over $300,000 right now. I'm not good for half of it. If that's not being broke, what do you call it? If you back me with that fence wire I can pay out."

Judd got his wire. When he had it loaded on wagons, along with posthole diggers, staples, crowbars, axes, hammers, and wire stretchers, the caravan swung south on Main Street and halted in the busiest section of town. Judd climbed atop a wagon and shouted to the gathering crowd. "There's a dollar a day and all you can eat for every man who wants a job building fence. When the wagon comes to town Saturday nights, you can come with it."

Twenty-one men pushed toward the wagon. Judd said, "Get your bedrolls, boys, and kiss your gals good-bye."

In a few days, 6000 acres of virgin range land went under woven wire fence. The first major change in the history of range sheep business was underway. As each pasture was finished, Judd would lay off the two herders and the cook necessary for handling a band of 2000 sheep, and put the money back in wire.

Judd's troubles, even when the entire ranch was fenced, were not over. He fought coyotes for years. His hunting crews rode hard from dawn till dark with shotguns, strychnine, traps and clubs. With the help of neighbors they so thoroughly

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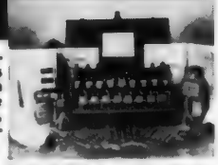

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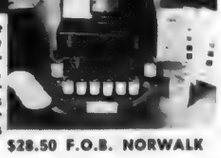

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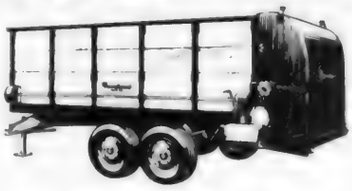
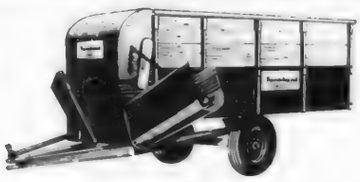


6-TON "POWER-BOX" FEEDER is available with 16" auger or 18" belt-type discharge. PTO-powered, gear-driven conveyor; ¾" treated marine plywood floor and heavy-duty aluminum alloy sides. Mounts for front or rear discharge on truck, Farmhand Tandem Trailer, or Heavy-Duty Wagon.



4-TON "POWER-BOX" FEEDER gives you fast, efficient mechanical feeding at a low cost. 12" auger discharge handles both dry and green feeds. Aluminized steel sides, ¾" marine plywood floor, choice of full roller chain or #67 detachable chain floor conveyor. And, both "Power-Boxes" convert from Feeders to PTO-Spreaders, Forage-Silage Units or all-purpose haulers by simply switching or removing attachments.

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cleaned the area of coyotes that they are rare even today.

Though land for himself and his children has been the motivating power of Judd's life, he has used sheep as a medium of exchange to build up his kingdom. The McKnight sheep of today are third and fourth generation Corriedales from Delaine and Rambouillet stock. Last year's wool clip on the ewes averaged 12 pounds and the lambs weaned off at a husky 75 to 80 pounds. Judd has always placed great stress on wool. "The first ewes I had here sheared only five or six pounds," he said. "The hardest job I found here was breeding up ewes to where they'd make a profit."

Besides being the first sheepman in the Southwest to turn his sheep loose in fenced pastures, to fend for themselves much like wild animals, Judd was the first to shear his ewes before they lamb in April. He was warned that many ewes would die from exposure, but only in one instance has this proved true. A bunch of about 150 freshly shorn ewes were penned south of a barn on the Blackwater one March, and a sudden sleet storm roared out of the northwest. The ewes could not be driven into the face of the wind to the protection of the barn standing two or three hundred yards away, and about 100 died.

The early shearing has been credited with raising the lamb crop percentage of McKnight outfit sheep to about 92 per cent. "Take ewes like ours with three or three and a half inch staple wool," Judd

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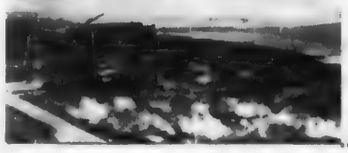

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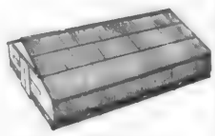
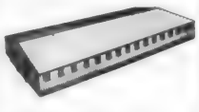


GENERAL PURPOSE BARN
A 52 ft. x 56 ft. building with over 2,700 square feet of usable floor space. Easily adaptable to other needs.



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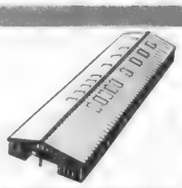
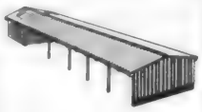


AGRICULTURAL ACTIVITIES CENTER
A 56 ft. x 208 ft. easy-to-build structure designed for all around use. 26 ft. clear-span area for drive through.



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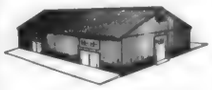
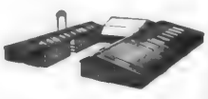
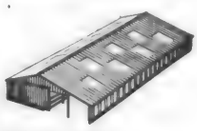


HOG HOUSE
A 24 ft. x 32 ft. building with central work alley. Movable partitions, doors and windows on all sides.



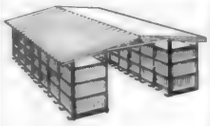
70-COW PEN STABLE
An efficient, modern, multi-purpose stable that's a combination loafing barn and feeder barn. 145 ft. x 143 ft.

BEEF CATTLE BARN
52 ft. x 56 ft. with 26 ft. central clear-space area for easy unloading and storing of hay and feed.

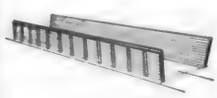


35-COW PEN STABLE
A 67 ft. x 91 ft. multi-purpose building with a 26 ft. clear-space area for loading. Easily adapted layout.

SINGLE CORN CRIB
5', 7', or 9' wide by 28' long single corn crib provides a sturdy, well-ventilated storage space.



DOUBLE CORN CRIB
Double corn crib (2—single cribs) with roofed drive through, provides shelter for loading and unloading.



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KOPPERS

KOPPERS PRESSURE-TREATED POLES

P-14

said, "and a lamb has a hard time finding the teat. Get that wool out of the way and he don't have a bit of trouble."

Recently, John Cooper, his son-in-law, returned from a trip through the sheep country of Wyoming and Montana. Talking to Judd one day, he said, "Dad, how could we make a living on sheep if we had to pay herders three hundred dollars a month like they do up north?"

"We couldn't," Judd answered. "But they can. Their land is cheaper, and that's one reason it is cheaper."

Judd's search for better sheep, especially for rams that would sire the right kind of replacement ewes, has led him all over the United States and Canada. In 1950 he defied the warning of friends that he was wasting money and flew to Australia and bought almost the entire yearling crop from one of the leading breeders there. He is confident the importation increased the wool clip of the sheep by two or three pounds and the weight of lambs by 12 to 14 pounds. Even though the trip cost him $50,000, he feels it was a good investment.

When Judd McKnight launched his career he chose the added hazard of being a sheep man in a cattleman's world. He had to be hard, and hard he was, and is. There wasn't much time for the amenities when he was a boy. You don't learn table manners when you slop a ladle of stew onto your plate and you squat on your heels while you gulp it down; you don't get much book learning either, where the school is miles away; and a fellow has to eat and he can't have both.

Judd McKnight had one day of school. He taught himself, after a fashion, how to read and write, but not very well, and he seems to be rather proud of it. He gets along very well using a pile of stones if he hasn't a pencil and pad handy. His office is a dog-eared note pad which he carries in his hip pocket. He does a good deal of figuring in his head. He can give you the answers but can't tell you how he does it.

He has made firm friends—and enemies just as firm. He has helped many a young fellow get started, but the same young fellow is on his own in a deal with his benefactor. He's steel-hard in a trade; he did not build his domain by throwing eiderdown pillows at his opponents.

He is not only tough in spirit, but tough in body. He packs a hard-twisted 190 pounds on a five-foot, eight-inch frame. His nose is wide and flat and he has a rock-like jaw. He walks with a belligerent swagger, like a man bent on twisting the tail of the world and carrying it off over his shoulder. He knows the value of looking prosperous—his jeans are creased to a knife-edge, his boots shined to a high, expensive luster. He spends a lot of money on his hats. A string tie fastened at the throat by a miniature thunderbird, presented to him by an Apache friend, decorates his shirts. He has trouble with his teeth, which he usually carries in his shirt pocket or near him on the seat of his car, ready to pop into his mouth on a moment's notice. His voice is high-pitched, but as direct and positive as desert sunlight.

The physical and mental ordeals of his seventy-six years have made no apparent dent in him. His shrewdness hasn't lost its edge, and he'll still come to close quarters in a trade with no great reluctance. But he makes friends easily with his lusty humor, and his hospitality is in the traditional Western style.

Once he was asked if ever in his life he'd been discouraged enough to quit. "Hell fire no!" he snapped. "What's there to get discouraged about? Just make up your mind what to do and then go ahead and do it."

This ability to hang on when weaker men fell away, and his sharpness in a trade, left behind him some sharp-edged feelings. During a prolonged drouth in the Southwest during the 1920's, many ranchers folded and the banks and loan companies found themselves in the sheep business. They thought of Judd, who by this time had a reputation for making a bad thing look good. He took over many a herd for the debt at the bank, piled up his assets, but left very little good will along the way.

Judd had a method of getting credit for himself—he often needed credit, for while he was expanding he was never out of

debt. He always looked prosperous, and when he faced a banker he was as full of confidence as a pickpocket at a country picnic.

A banker once said to him, "You're hiring too many herders. They cost you lots of money."

Judd said, "I'm out of grass. I've got to have herders to take my sheep up in the mountains where they'd never go by themselves."

The banker reached out and asked for Judd's hat. He turned it over and examined the label. "That hat cost lots of money. How can you afford an expensive hat when you're almost broke?"

Judd looked the man squarely in the eye and said simply, "I want to look better than my men."

He has been known to plan for years just how to buy a piece of land from a stubborn owner and admits he works out many of his deals in bed, when he ought to be sleeping.

When Judd was a young man he once heard a representative of an eastern packing company was coming to Roswell to contact an order buyer. He got an order for 15,000 lambs before any other rancher knew the buyer was in town. The packer agreed to pay market price. Riding horseback, Judd scoured the plains and mountains, buying lambs in bunches of fifty to two thousand, and paying about a third less than market price for them.

First thing when he got back to Roswell, his best friend, Abe Pruitt, buttonholed him on Main Street. "Boy," Pruitt exploded, "I just found out what you're selling those lambs for and I know what you are paying for them. If these ranchers find it out, they'll mob you. They'll never deliver, either."

Judd grinned, "I bought them fair and square. They'll deliver." And they did. Inside of a week Judd loaded 14,000 lambs on the cars at Roswell—just 1000 short of the order. He cleared nearly ten dollars each on them.

Judd has the reputation of being an extremist. There is no gray in his life—it's either black or white. He'll take the last penny in a trade and expect the same treatment in return—he expects no more from any man than he's willing to give.

Judd's shrewd business ability is a source of amazement around

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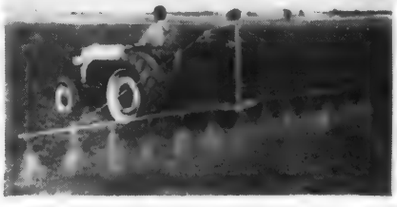

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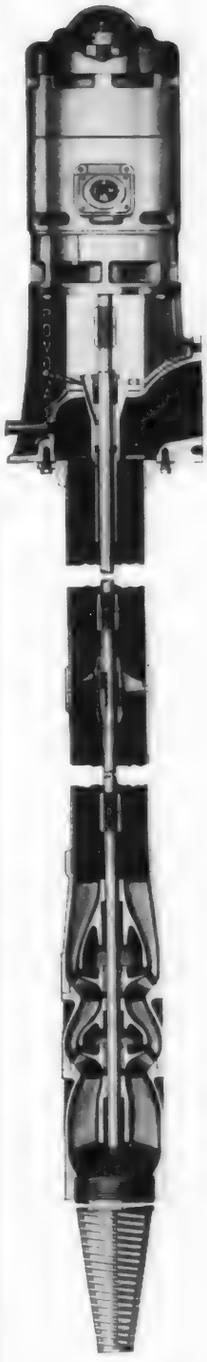

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business houses in Roswell. Jack Moore, president of the First National Bank, said, "Judd always starts out by saying, 'Now I never got to go to school, but . . .'. Nine times out of ten he'll out-figure you and have it done before you get started. Never, since Judd started doing business here, has there been a time when he was loaned money strictly on his material assets. He has demonstrated the most unquenchable determination of any man I have ever known. That is why, many times in the past, the bank has gone along with him when he owed more than he was worth. Judd can sell a little higher and buy a little cheaper than any man in the Pecos Valley."

The greatest joy in Judd's life was to see his children grow up with his own fierce love of ranching. He set each of them up on ranches of their own. In 1950 the McKnight Sheep Company, a five-way partnership, was organized.

And it is the round-up each autumn which is the big event for the McKnight outfit. That's when old ewes are culled and lambs sorted out for sale or for breeders. It is at these roundups, when the boys are together and working the sheep, when the wives gather their broods and prepare a barbecue of mutton at the Home Ranch—where the fall's work traditionally starts—that Judd McKnight is the happiest. From the time the riders head

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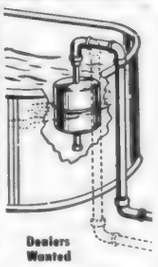

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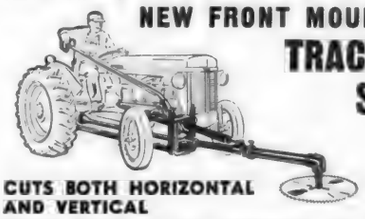

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out to round up the thousands of sheep until culling and loading is done, Judd is where the dust is thickest and action is heaviest.

Last fall Judd rode his dun pony through a mass of sheep in the big corral to watch four of his grandsons as they helped the Mexicans "tooth" the sheep. A visitor asked him, "What's going to happen to this place when you're not around to run it, Judd?"

Judd's mouth lifted at the corners in a quiet smile. The saddle leather creaked as he half turned to watch his grandsons at work. "It looks like the good Lord has taken care of that for me," he said.

THE AUTHOR: Frank Farmer, who lives in Walnut Grove, Mo., is widely known in the agricultural journalism field. On the side he runs a farm and is business manager of Springfield Newspapers, Inc., of Springfield, Mo. Mr. Farmer knows Judd McKnight well—he's writing a biography of the rancher.

IT'S CHRISTMAS TREE TIME AGAIN

(*Continued from page* 33)

"If I were starting all over again, I'd do just as I did 20 years ago. I'd first check up on the nearby market before I'd plant any trees. Any grower will tell you that growing is second to marketing. You can sell them any number of ways, though I sell mine direct. On Saturdays in December, I stay close to the roadside stand. During the week, people ring the bell and we come down to the stand from the house. Stores like supermarkets will take them in truck lots, but you've got to line up sales in summer or even earlier to beat the big shippers. Sell on a cash basis only. Wholesaling can be a cut-throat business. Some big producers sell on consignment, but a small grower can't afford it. Stores usually buy shipped trees at so many dollars a bundle, with about eight 4-foot trees in a bundle, but the next bundle might have only one 12-foot tree in it. Trees within a foot or two alike are bundled together, and are tagged according to the size of the smallest tree in the bundle. A 5-foot bundle might contain one 5-foot tree with the remainder 6 or 7 feet in length. A dealer has to take an assortment of sizes in mixed good and bad trees. If you can guarantee him well-shaped trees running mostly from 6 to 8 feet, he should be willing to pay a premium, especially since your trees will be fresh and less damaged."

The commercial mark-up in trees is often fantastic. A storekeeper has to make enough on a handful of superior trees to pay for all the lop-sided, scrawny specimens he is going to be stuck with on Christmas Eve. The day after Christmas, the left-overs will cost money to be hauled to the dump. City retailers who pay 50 cents to $1 for a 7-foot tree mark it up all the traffic will bear, which usually means $1.00 to $1.50 a foot, or between $7 and $15 for attractive trees—up until late on Christmas Eve, when the asking price plummets to your price, your choice.

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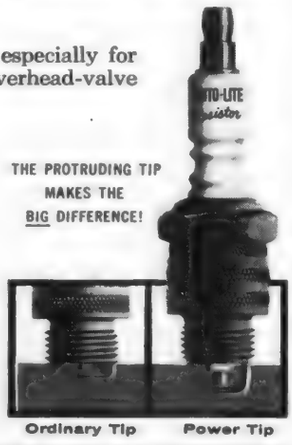

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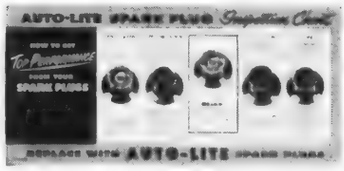

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In some cities, the freight alone on shipped trees runs higher than the cost of the harvested trees where grown. In such cases, local growers can demand higher prices. Prices of various varieties of trees can be confusing. In some towns, spruce brings twice as much as pine because spruce takes almost twice as long to grow. Retail prices people will pay for some varieties of trees through preference, often have no relationship to the real value of trees in growing and handling expenses.

One of the real problems in raising Christmas trees is the seasonal labor requirements. Marion Van Slooten of West Olive, Michigan, who is one of the owners of Van Pines Nursery, a 1200-acre tree plantation, tells how they do it: "During our planting, trimming, and cutting seasons, of course, we hire additional help. In the planting season, generally, we hire quite a number of young boys and some young men. These young boys, anywhere from 14 years or older, will be doing what we call hand planting which has to be done by hand rather than the planting machine. During the summer, we hire as high as 50 young boys for a period of three months to prune the Christmas trees. These boys are all furnished with hedge shears and each of those trees we intend to market is trimmed so that it remains symmetrical in shape to become a number one Christmas tree. We also have an insect-control problem and we cure part of this when we trim off the bag worms.

"This also requires some additional help and generally this is in the form of young men. During the cutting time in the fall, of course, much additional help must be hired to pull the trees from the fields, tie them, stack them, and then load them on the trucks or railroad cars to be shipped to market.

"In years gone by, we cut our Christmas trees with axes. This left a ragged appearance and also left a large number of stumps in the field. The stumps punctured tires on our vehicles so we were looking for a way to get around this. Also, Christmas tree buyers each year are becoming more particular about the type of tree they are getting and they object to a ragged-appearing butt. So we were looking for a new and faster method of harvesting our trees that would also help them retain a good appearance. About six years ago, after some experimentation, we found a type of saw on the market that enables us to eliminate about 60 per cent of our cutting personnel. We turned to the Hoffco Brushette attachment, which has a 10-inch cutting blade. This blade does a very smooth cutting job and we find the saw lasts for a good many trees before it has to be sharpened.

"Our practice at the present time is to cut 500 trees and then change to a fresh saw blade. A man in the field with one of these power units is expected to cut 1000 trees in an eight-hour day. He should do this without particularly tiring himself and also do an efficient job of cutting the trees. The general procedure is to change blades once during the day and then in the evening all our saw blades are sharpened. With our old method of cutting with an axe, a man would have to work very hard to cut 500 trees. If he did cut 500 trees with the axe they had to be pulled to the marketing yard and resawed to get a smooth, square butt, something that is presentable to the Christmas tree consumer.

"Our Christmas trees are marketed entirely on the wholesale level," says Van Slooten. "In selling, we take orders on these trees as early as January of the year that they are to be marketed. General selling practice is to take a deposit with the order and the balance on the delivery of the trees. We take orders for trees all summer and right on up to shipping time. Our trees are shipped as far south as Miami, Florida, as far west as the Rocky Mountains, and as far east as New York City. They go to all types of wholesalers. Some are used in the forestry trade, some are used strictly in what is known as the 'green tree trade,' sold on various Christmas tree lots throughout the nation."

More than 25 million U.S. trees were marketed last year, with around 12 million of them shipped from Canada. Surveys indicate that 8 out of 10 families, besides countless institutions and business firms, purchase trees each December. The demand is increasing with the population. But we do have overproduction in some areas and poor quality is widespread. Over-

production and poor quality go hand in hand. There is the chance this will be changed since Government grading of trees became effective November 1, 1957. The grading provides for U. S. Premium, U. S. No. 1, and U. S. No. 2 grades. Growers' associations are behind grading. It protects grower and buyer alike. Already, many growers have set up their own grades and are proud enough of their trees to label them with their name tags.

Christmas tree inspection and grading service will be provided by the Agricultural Marketing Service at shipping points and at terminal markets. This service is voluntary and will be available on a fee basis. In addition to meeting specifications for a U. S. Premium, U. S. No. 1, or U. S. No. 2 tree, a graded tree must have the characteristics of its species, have a handle approximately 1¼ inches long for each foot of tree height unless other handle length is specified; it must be smoothly cut across the butt, and all side branches below the first whorl must be removed.

"It pays to grow several kinds of trees," according to Tom Price, who grows Christmas trees near Newark, Ohio. "Buyers are choosy," he says. "Some don't know one kind of tree from another by name, but they know by sight. Some like long needle, some short needle. There's other advantages in a mixed planting. The shearing job is spread out, since all kinds don't require shearing at the same time. Tree varieties respond differently to local bugs and blights. Disease can put the one va-

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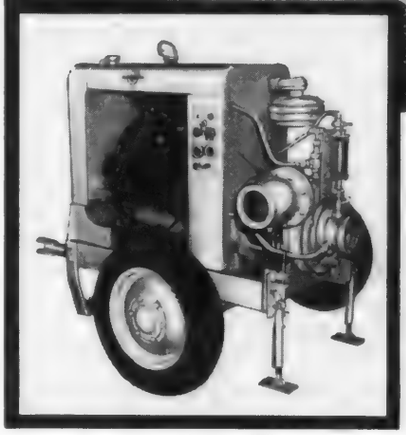

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riety grower out of business. It's a good idea to mix fast and slow-growing trees, then trees of one variety won't all be ready at once. About two-thirds pine and one-third spruce and fir keeps something coming on the same land. The pine takes 6 or 7 years, but the short-needle kinds take 9 or 10 years."

Of the long-needle pines, the red, Scotch and white pines are best for Christmas. Balsam fir, Douglas fir, black spruce, eastern red cedar, Norway spruce, white spruce, white fir, and Colorado blue spruce are the preferred short-needle kinds. In the East, balsam fir or spruce are usually favored; in the Midwest pine is becoming more popular, while Douglas fir has long been standard in the mountainous West.

No species of Christmas trees and few individual trees within a species have all the requirements, but the USDA considers these ideals worth shooting for:

1. *Good green color.* Not only the kind of tree but the conditions under which it is grown and the care given it from planting through harvest and shipping determine cut-tree color. Disease can cause yellowing in any species. Color, along with other qualities, varies considerably within a species. Scotch pine, for example, is available in Polish, Swedish, and other strains, tending toward characteristic shadings, but varying with growing conditions.

2. *Good needle retention.* Length of needles does not determine needle retention. Tests at Cornell showed that at 80-degree room temperature, Douglas fir kept its needles for 30 days, red pine for 20 days, Scotch pine and balsam fir for 15 days, with spruce and hemlock holding their needles for only 5 days or less. Shipped trees are tightly bundled not only for convenience in transport, but also to prevent excessive loss of moisture which causes needle-drop.

3. *Pleasing fragrance.* This, too, is a case of freshness as well as of variety and the strain within a variety.

4. *Good conical shape, with a straight main stem.* Few trees are symmetrical without some shearing during growth. Long-needle kinds need more shearing than the short-needle varieties. Generally, slow-growing trees attain a better symmetry with less shearing.

5. *Good branching.* Variety and shearing techniques are mainly responsible. The branching should be full, without undue prickliness. Customers want branches that will support ornaments without sagging. Growers want springy branches that will permit a tree to retain its shape after being tied if shipped.

The kind of tree to grow is the kind of tree you can sell. Soil and climate narrow your choice. Here are the most popular kinds, all widely available through nurseries.

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shearing. Needs a rich soil with good subsoil drainage.

BALSAM FIR. Prefers fairly good soil and moist locations in colder climates. Tolerant of some shade. A very fragrant tree and, to many people, the traditional Yuletide evergreen but not as good in needle retention as Douglas fir.

COLORADO BLUE SPRUCE. A beautiful tree, dense, colorful, and often looking its best when sparingly decorated. A very slow grower and hence commands top prices. Prefers open sunlight; will do well in most average soils except wet land.

DOUGLAS FIR. Slow grower, but produces good trees with little shearing. Best on high elevations and northern slopes in medium soil. Don't plant in frost pockets or low places. Maintains freshness well, but has more restricted areas of sales appeal.

NORWAY SPRUCE. One of the best in color and very popular with buyers. Fastest of the spruces. Little shearing. Prefers heavy, moist soil and will grow in partial shade. Like all spruces, it sheds soon.

SCOTCH PINE. Will thrive in most any soil except damp, heavy types. Holds needles well. Strong branches for carrying ornaments. Fast grower and hardy, but requires considerable shearing for shapeliness.

WHITE SPRUCE. A slow grower for better soils and colder climates. Can stand reasonably dry or damp locations and will take part shade. Minimum shearing.

WHITE PINE. Prefers light, sandy soil; does well in most poor soils. Fast, with a leggy tendency. Becomes misshapen without regular shearing.

Except for shearing, the labor of tree farming comes in slack periods on the farm. Planting is done before general field work begins and harvesting comes in late fall. As for land, most farms have acreage unsuited to crops or pasture which might profitably be set to conifers to hold the soil, as windbreaks and eventual timber, as well as for Christmas tree cuttings and aromatic firewood for the hearth. A circle of evergreens above a farm pond not only keeps the water clear and unsilted, but does not litter the pond with leaves.

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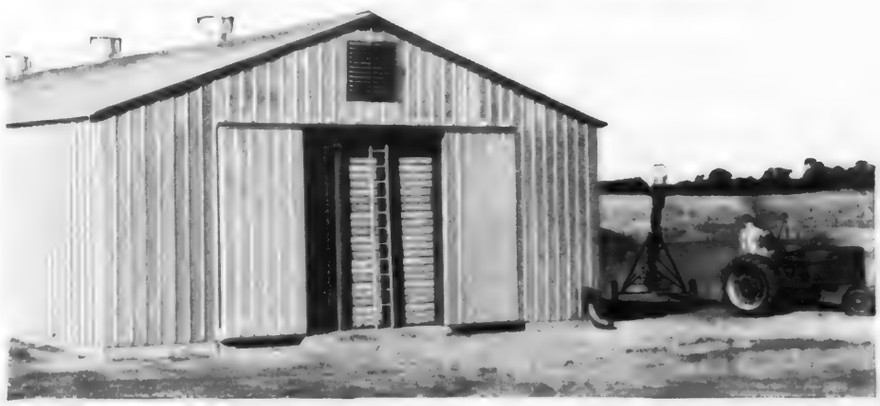

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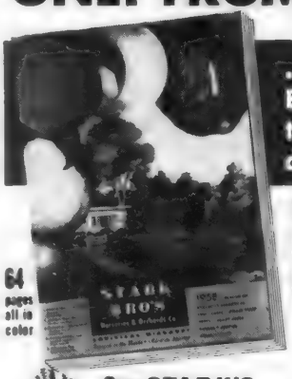

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equipment is needed; trees are cheap. A thousand pine seedlings, enough to plant an acre, can be had for as little as $15. Price alone is a poor decider. A typical eastern nursery's catalog offers 10-to18-inch, 3-year-old Scotch pine seedlings, not transplanted, at $30 a thousand. The same nursery offers 6-to-10-inch, 4-year-old Scotch pine, twice transplanted, at $75 a thousand. The smaller, higher-priced transplants would produce superior trees in a shorter time, primarily because transplanting develops better root systems. Likewise, loss from drouth and weed competition is always greater when untransplanted seedlings are used.

Nurseries ship in early spring. Trees should be heeled in, in a shady location, if immediate planting is inconvenient. The heeled-in trees should be covered with moist earth to within a few inches of their tops until planting time. As soon as the frost is out of the ground, planting should get under way.

Soil needs are not fussy. Highly fertile ground encourages weed competition with high tree loss or fast tree growth which causes spindliness. Steep, rocky areas make care and harvest difficult. Marsh ground is unsuitable. Soil of medium fertility, with at least fair drainage, is best, located where block planting is possible, with access lanes established for harvesting and fire protection.

A mattock is the only tool needed for planting in stony ground; in soft soil a spade or planting bar works better. The simplest method is to scalp off the sod with a mattock or grub hoe, then drop the seedling into a slip made by driving the mattock straight into the soil. The tree is firmed with the foot, a pace forward is made for spacing, and the operation repeated.

Plants should be carried in a bucket with the roots covered with a thin, soupy mud-and-water mixture. Two men work to better advantage. One opens holes in rows previously staked, the other carries and drops the plants. A third man can hasten the job by firming and straightening the trees.

"The catalogs say one man ought to be able to plant 1000 trees a day," says Ed Bonzo. "Half that is a good day's work. The most I've ever planted alone in a day was 700 and I couldn't straighten up after the day was over."

A number of makes of planting machines, most of them for 3-point tractor hook-up, are on the market, with price tags in the $350 range. With them, a three-man team of driver, planter-operator, and follower to right misplants, can set 10,000 trees daily. Custom planting is available in some areas. Smith's Forest Tree Nursery of Magnolia, Ohio, does planting on contract, supplying trees dug within 24 hours prior to planting and offering a guarantee of 90 per cent survival.

Mechanical plantings give accurate spacing. Spacing is important. Width of mowing equipment enters the picture, species of trees alter it and stage of harvest has influence on spacing. Specialists disagree on distance, with recommendations at wide variance. These are typical:

3 feet by 3 feet.....4840 trees per acre
4 feet by 4 feet.....2722 trees per acre
5 feet by 5 feet.....1742 trees per acre
6 feet by 6 feet.....1210 trees per acre

Most growers use the wide spacings since a 7-foot tree, the most popular, in most varieties has a base spread of 4 to 5 feet. Superior trees are harvested each Christmas, with the remainder thinned as necessary to grow timber or posts. Close spacing is practiced by those who have a sale for 2-foot, live, potted trees, a growing market in some areas. Trees are selected as a thinning operation. The following season further thinning is done, with 3-foot trees sold as table trees. In this system, every other row is cut out completely for table use. That year, or the following year when a height of 4 or 5 feet is reached, every other tree in the remaining rows is harvested. Spacings originally set at 3 feet become 6 feet intervals, which is about right for trees to develop into symmetrical trees 6 or 7 feet in height. The system gives an earlier cash return and brings in crops for 3 or 4 seasons.

Care the first season is primarily a case of mowing the weeds. Where planting has been carefully spaced, mowing in both di-

rections is easier. Where possible, Ed Bonzo uses a garden tractor equipped with either a sickle bar or a rotary mower attachment. On his steeper, rocky acres, Bonzo makes quick work of the weeds with a power scythe, mowing a circle around each tree with the shoulder-carried, gas-engined new tool. "Even mowing is unnecessary," says Bonzo, "unless the grass becomes high. Planting in sod is an advantage. Low grass and clipped weeds hold moisture, like a mulch."

Grazing is never permitted. The young trees must be watched for dead shoots and bare branches which indicate insect damage. Bag worms are Bonzo's worst pests. Hand spraying the 30-acres of individual Christmas trees with two pounds per acre each of DDT and arsenate of lead used to be a chore. Most of his land is too steep for a tank sprayer. "This year I beat the bugs," he says. "An airplane spray did the job. My 30 acres of timber and Christmas trees cost me a total of $130, but it was well worth it. I've only found two bag worms all season."

The newly adopted USDA gradings in trees make shearing more important than ever. Most trees profit by it, though pines require it more than other varieties. Shearing starts in June or July with some varieties, but can be delayed until fall with other kinds. Winter nipping of terminal buds is often done. This practice, like the practice of the deliberate scarring of the bark of the lower trunk, is designed to slow up growth to increase density, as well as to aid shapeliness. Every tree has to be sized up and altered as necessary. "You don't have to baby them, but when they need shearing, you can't put it off," Ed Bonzo cautions.

Shearing is done with a hedge shears or a pruning knife. Methods vary, but the primary aim is to prune to a single leader and to slow up growth to about 12 inches a season, with a dense, conical tree resulting. Each variety reacts differently to the method and time of shearing. "It's a fairly new science," says Bonzo. "Everybody has a pet theory. Most states publish

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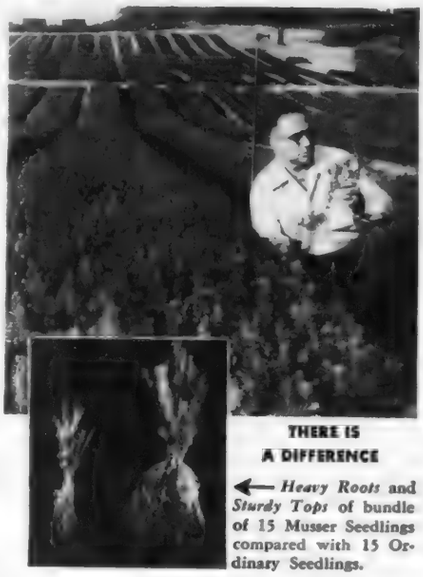

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Tree Talk

by

Will Rusch

It seems like hardly a day goes by but what I don't receive a letter from someone asking when and where to plant a stand of trees.

As far as the "where" is concerned, that's easy. The answer is mainly one of economics—of deciding which acres are the poorest producers of crops and forage or are too steep for efficient farming. Since trees thrive on land that's often unprofitable for other crops, they rate mighty high as an investment.

And, unless the ground is covered with a heavy sod, no preparation at all is necessary. A man who plants his seedlings in a heavy bluegrass sod though, might well experience a 100 per cent failure. Not only does the grass furnish heavy competition for moisture, nutrients and light, but it's a favorite hiding spot for field mice and grubs, both of whom feast on young seedlings during the winter.

So, the rule is to plow out a furrow in which to plant the seedlings when the site is in heavy sod. That takes care of the "where."

When to plant depends largely on the area. For example, fall is the more acceptable time in North Carolina and on south. In Ohio, Indiana and other parts of the Midwest, spring is best because of better moisture conditions and absence of frost. Best advice on this matter can be obtained from the state foresters or nurseries which supply the seedlings.

Here are some of the main sources of forestry information:

- The Forest Service of the U.S. Department of Agriculture with its regional offices throughout the country and in Alaska.
- The State Extension Foresters in each state.
- The Tennessee Valley Authority (for those in the TVA region).
- Local lumber and pulpwood mills.

Hibernation in the winter may be okay for bears, but it certainly doesn't set well with Irving Stewart, owner of an 80-acre farm at Warroad, Minn.

Never one to sit around and wait for the snow to melt, Mr. Stewart bought a McCulloch chain saw last winter and quickly proceeded to cut 180 cords of jack pine and spruce pulpwood, 1200 cedar posts, 75 cedar poles, plus enough firewood for the entire season. He netted $1600 for his labor!

Just about everyone I've talked to lately who's tried the new McCulloch Super 44 or Super 55 chain saw tells me, "There's nothing like it." For sheer cutting power and light weight, there's never been a chain saw pair to compare with these yellow devils. The Super 44 (direct-drive) weighs only 19 lb and packs 6.5 horsepower; the Super 55 (gear-drive) tips the scales at 22 lb and registers 6.5 hp. If you want to cut lots of wood faster and easier than ever before, one of these two is just the ticket.

For more details on McCulloch's new Power Pair, just write to me, Will Rusch, McCulloch Tree Topics Bureau, 6101 West Century Blvd., Los Angeles 45, California. I'll send you a free colorfully illustrated folder in a jiffy.

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bulletins on it, but the best sources of information are growers' associations and state tree farm demonstration."

Even with care, 5000 trees per acre don't add up to $5,000. Neglected stands often yield no more than a half dozen good trees per acre. With well-managed stands, tree farmers consider the production of from 25 to 50 top quality trees each year and continuing for years a good average per acre. That is for mixed plantings. By a fairly new practice, stump culture, additional income results in tree sales from regrowth of sprouts from large stumps in cut-over plantations.

Ed Bonzo sells about 600 trees at his roadside stand each season. They retail at from $3.50 to $5.00. "It will never make me rich," Ed has said, "but there are other dividends. Maybe I'm a sentimental old fool, but I like to think I'm doing more than just selling trees like merchandise. I feel like I'm part of the Christmas celebration in half a thousand homes. Years ago when I sold my first trees, I knew I was in the right business. It was a Saturday afternoon, a cold December day, and with the sale of a few trees and other produce at the stand, I had a number of cars waiting. There was this small kid, maybe five years old. Belonged to one of the cars, I guess. But he had a sticky nickel in one hand and the other was clutching a little tree of mine as if he were holding eternity in his hands, with his heart ready to burst. He was just a small boy and it was just a tree, but it gave me the feeling that I was doing more than making a living from the land; I was making a lot of people happy, bringing families closer together, helping spread good will toward men."

Editor's Note: State Foresters in each state, usually located at the state experiment farms, can supply lists of local nurseries who specialize in seedling Christmas trees. A representative list of national nurseries who sell trees for tree plantations is available from FARM QUARTERLY, 22 East 12th St., Cincinnati 10, Ohio.

The new Christmas tree grading standards that went into effect November 1 were developed by the Agricultural Marketing Service at the request of the National Christmas Tree Growers Association and several state associations. They can be obtained from your state forester or from any of the state nurserymen's associations.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., OF THE FARM QUARTERLY

Published quarterly at Cincinnati, Ohio, for October 1, 1957. Required by the Act of Congress, August 24, 1912, March 3, 1933, and July 2, 1946. Publisher—F & W Publishing Corporation, Cincinnati, Ohio. Editor—R. J. McGinnis, Cincinnati, Ohio. Managing Editor—Grant G. Cannon, Cincinnati, Ohio. Business Manager—Aron M. Mathieu, Cincinnati, Ohio. Owner—F & W Publishing Corporation, Wilbert Rosenthal, James Rosenthal, Aron M. Mathieu, all of 22 E. 12th St., Cincinnati, Ohio. There are no bondholders, mortgagees, or other security holders. Sworn to and subscribed before me this 7th day of October, 1957.

(Signed) Aron M. Mathieu, Business Manager
(Signed) Clifford Laemmle
My commission expires October 5, 1960.

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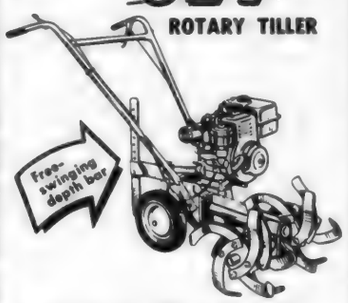

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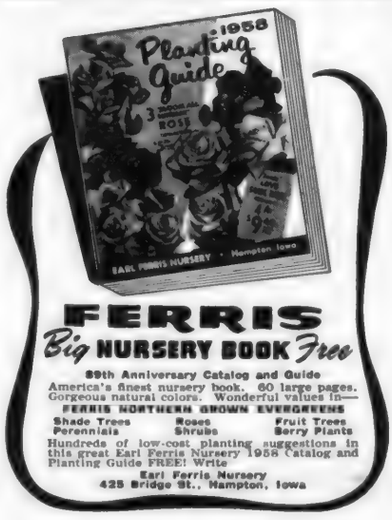

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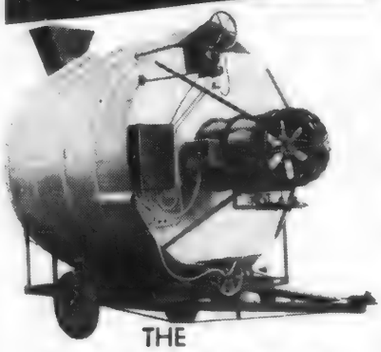

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CASE OF THE NAUGHTY NITRATES

(*Continued from page 43*)

First step was to take a botanical survey of the plants, to analyze them and determine if any of them could be blamed for the abortions. The botanists identified over 90 different species of plants in the wild pastures, some 50 in the tame pastures.

In the meantime the agronomy and the agricultural chemistry departments carefully studied all events that seemed in any way to have a bearing on the problem. There was the mystifying case of the two silos at the college which were filled with alternate loads of grass from the same field. Silo gas poured from the one, the other was completely free from the toxic stuff. The only explanation seemed to be that the length of cut differed.

They studied a report on 17 cows which aborted on silage fed out of a silo which a hired man had sealed with old ammonia nitrate bags which he wet down with water. Their attention was called to a herd of 140 beef cows which for some unknown reason ignored a lush field of canary grass and sweet clover and beat a path to a patch of stinging nettles which they devoured with relish. Eighty-four of them aborted.

And there was the case of the marsh farmer who had gotten a 100 per cent calf crop four or five years in a row despite the troubles of all his neighbors. The only distinction that could be noted in his operation was that he did probably a little better job of keeping the weeds down.

The soils in the marsh area were found to contain an average of 300 to 450 pounds per acre of available nitrogen, 10 to 20 pounds available phosphorus, and 70 to 90 pounds available potassium. The pH ranged from 5.0 to 8.0.

In the spring of '56, M. P. Pinkerton, the county agent at Stevens Point, called a meeting of interested farmers and others to plan an attack from all angles. After a wide variety of suggestions had been heard from the floor, Julian Sund, a member of the agronomy staff, focused attention upon the conditions which seemed to the college people to be doing the damage.

"We know that cattle deaths are caused by oat hay in Wyoming and other western states," Sund began. "These deaths were found to be caused by nitrates which are stored in the stems of the oats. This seems to happen when the oats are growing in shade, or in deep valleys where there are few hours of sunshine per day. It is also known that some of the plants growing up here will store an excess of nitrates. We know elderberry contains hydrocyanic acid and nitrate, and possibly other weeds, too, will store nitrate. Since large amounts of nitrate will kill a cow, perhaps smaller amounts may kill the fetus and not affect the cow. Whether this could be the cause of the abortions or not we do not know, but we want to try to find out."

Then Sund went on to explain, in gen-

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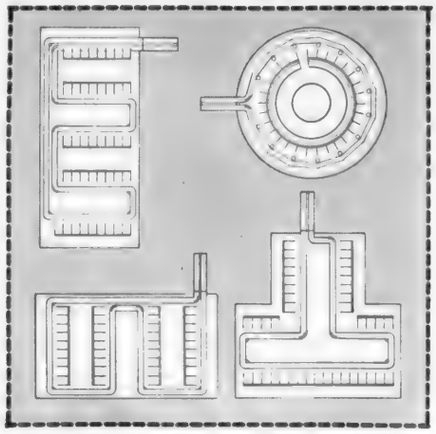

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eral, how the nitrate might do the dirty work, being careful to emphasize that his explanation was a greatly simplified version, and was not completely proven. "The nitrates," he said, "are taken in and are changed to nitrites in the cow's stomach. The nitrite changes the hemoglobin of the blood to methemoglobin which does not carry, or release, oxygen to the fetus; so the fetus dies and is aborted. If large enough amounts of nitrates are eaten, the cow may die from suffocation."

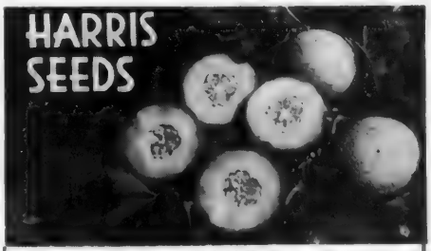
Madison Wright, another member of the agronomy staff of the College, explained to the group that none of the 90 weeds were known to be toxic, and that none of the known toxic substances causing death of the animals are known to cause abortion without other symptoms of poisoning.

Sund's thesis appealed to the farmers as worth a try. They formed the Buena Vista Research Association; Al Brown let them have one of his 40-acre fields with a known history of abortion for an experimental plot and the Portage County Bankers Association helped finance the purchase of eight heifers to supplement the dozen loaned by the farmers themselves for test animals on the project.

The test area was divided in half. One half was sprayed with 2, 4-D and 2, 4, 5-T and the other half was left in its native state as a control. The heifers were bred and turned on the plot in May. Ten out of the 12 heifers on the unsprayed area aborted within a month. Only one out of the 8 on the sprayed area aborted. Nettles, elderberry, boneset and goldenrod seem to be the chief offenders, though a large number of other weeds will also store nitrates.

This year the area which had been sprayed in 1956 was again given the same treatment and parts of it were also given an application of 6-6-18ME (ME stands for minor elements) fertilizer at the rate of 700 pounds per acre. As the experiment neared its end this fall all 10 of the heifers

HARRIS SEEDS



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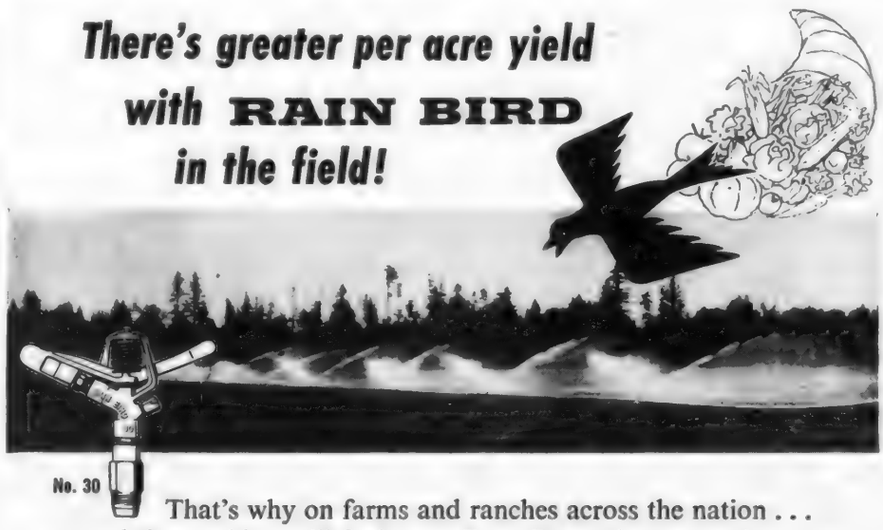

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on the sprayed areas and on the sprayed and fertilized areas were still carrying live calves. All 17 of those on the untreated area had aborted before mid-summer.

Dr. Joseph Simon, a member of the veterinary science department of the University, noted certain symptoms in the aborted fetuses and their placentas which heretofore have never been described and have not been associated with abortions caused by Bangs or other diseases. Dr. Frank Douglas, local veterinarian at Stevens Point, who examined the experimental cattle twice a week, told how signs of impending abortion are never apparent.

As a result of these experiments, the Wisconsin people are ready to say they know how to handle their problem even though they confess that it is far from solved. Apparently, if the pastures are fertilized early in the spring to give the grass a jump on the weeds; and if they are then managed properly by spraying and clipping, not only can the nitrate problem be licked but the carrying capacity of the land may be increased anywhere from three- to six-fold, offering a tremendous potential for beef production.

Adding nitrogen to this land, which is already overloaded with the element, may seem like pouring gasoline on a fire, but actually it is the very thing needed on these cold, unbalanced soils to get the grass away to a flying start in the spring before it runs into competition from the weeds.

How to control the nitrate content of plants and why the nitrate acts as it does on cattle are still moot questions, but the odds are that someone is going to come up with some pretty positive answers before long.

In Missouri

In Wisconsin, the nitrate problem is mostly related to a combination of lowland soils high in nitrogen and weedy plants that have an extraordinary capacity for storing inorganic nitrates. It is a condition peculiar to certain localities. But in Missouri and other states the problem has been tied up with plants under stress or with intensive cropping practices. While it was most prevalent during the drouth period it is also a hazard, as Ross Fleetwood, Missouri extension agronomist, says, "where the farmer is milking 15 extra cows to pay for the new bulk tank." Intensification of cropping seems to trigger it, and it is frequently the best farmers with the best cows who have the most trouble. As the wave of cattle deaths swept across the state during the drouth it was found that there went with it a positive correlation of high nitrate concentration in crops.

Normally, little or no free nitrate will be found in a growing crop. A reducing agent in the plant, activated by water, air, and the proper pH, transforms the nitrate to nitrite and then to ammonia. A number of factors may cause nitrate accumulation. Some of these factors are: drouth; nitrogen content of the soil; soil deficiency in certain other essential elements; or any disruption of normal plant growth. Oats, wheat, barley, corn, sorghum, many pasture grasses and many weeds may accumulate nitrates. Once the crops mature, though, the danger is past. The nitrates accumulate mainly in the stalk and leaves, below the ear in corn, for example, and when the ear is formed and matured the nitrates disappear. Analysis of some forages grown in drouth areas in Missouri show cornstalks with a nitrate content of 8.04 per cent, corn silage 2.04, second cutting alfalfa hay 0.66, sorgo silage 0.87. According to Dr. Arthur Case, professor of Veterinary Medicine and Surgery, University of Missouri, "Any amount of nitrate over 0.5 per cent in the total ration is a potential cause of trouble." Nitrate at a 0.75 per cent level will decrease milk production and at 1.5 per cent, death is likely to occur.

If cattle or sheep are grazed on a field high in nitrates, death can be expected within four days. Much as in the case of the abortions, the nitrate is reduced to nitrite in the rumen, the nitrite acts on the hemoglobin of the blood changing it to methemogloblin, and the animal dies of suffocation. At least, that is the theory at this moment. Strangely, some individuals seem to be much more susceptible than others.

According to Dr. R. R. Grayson, a physician of Perryville, Missouri, cattle can also die from nitrogen dioxide pneumonia.

His theory is that they ferment the forage in their rumen, belch up their own nitrogen dioxide and inhale the gas.

The nitrate content of the feed can change rapidly in a silo or even in the open air. Research workers can cite any number of cases to demonstrate the latter point. There was the field of oats a farmer intended to put up as silage. He brought a sample to the University to have it tested and found the oats contained 0.8 per cent nitrate. He waited a few days before cutting it and when he finally put it in the silo, the nitrate content was down to a safe 0.2 per cent. A silo full of corn which carried a lethal dose of nitrate was down to a perfectly safe level within 21 days. Fermentation in the silo made the forage safe.

On the other hand, the atmosphere can play dangerous tricks with fodder or hay stacked outside. A foggy morning bringing just the right conditions for certain bacterial activity and an otherwise safe stalk field or hay stack turns into a menace.

Jay Brown, Jr., a registered Hereford breeder at Mexico, Missouri, fell victim to just such a situation. One Sunday morning in mid-December, the winter following the big drouth, he went out to his barn lot and found 17 of his cows dead or dying. They had been grazing a stalk field and were being fed some hay besides. Analysis of the stalks and of the hay showed that neither carried enough nitrates to be fatal, but the two together, plus the peculiar atmospheric condition present that morning, did the job.

Another interesting case, showing what damage nitrates can do to a dairyman, concerns Ivan Borman, Fulton, Missouri. Borman bought a silo full of silage from a neighbor. Soon after he started to feed it, his cows dropped seriously in milk production. Then during the next two years, he lost 47 head out of his herd of 100 registered Holsteins. He had been averaging around $2300 a month on his milk check before he ran into his trouble; now his milk checks are $600 or less. Borman contends that unbeknown to him the trouble-making silage had been tested for nitrates and found loaded before he bought it. The field from which the corn for the silage had been cut had been fertilized with 150 pounds of

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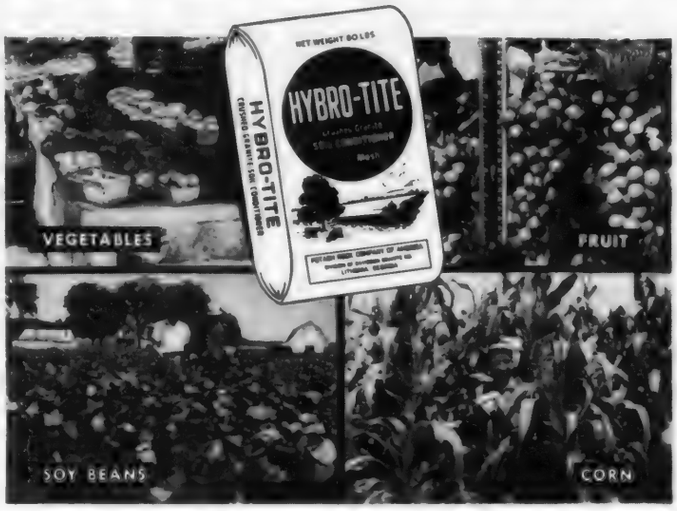

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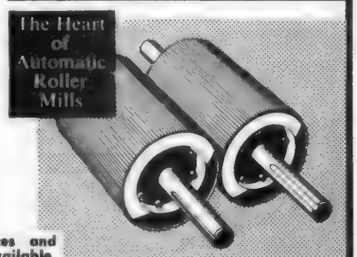

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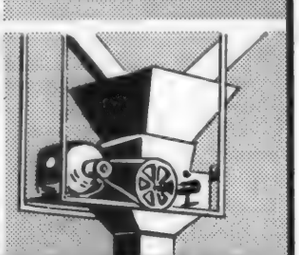

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actual nitrogen per acre with no potash or phosphorus to balance it. The Callaway County Court records attest to his dissatisfaction with the deal.

The Palmer Brothers, at Ethlyn, Missouri, ran into nitrate trouble, but not because of drouth. They were irrigating and green chopping 19 acres of Sudan grass for 100 cows. The land had been heavily manured (30 to 40 tons per acre) and had received supplemental nitrogen year after year. Suddenly, in mid-summer, 20 cows lost their calves. Leptospirosis was at first thought to be the cause. But the tests for lepto proved negative while the Sudan grass showed 1.8 per cent potassium nitrate equivalent. The manure spreader can be just as responsible as the fertilizer bag for a high-nitrate condition.

The point has been made in some quarters that the nitrate trouble is caused not so much by excessive nitrogen as by an imbalance of the other elements in the soil. Acting on this theory, workers from the soils department and the agricultural chemistry department of the University took approximately 1000 pounds of soil from the field where the Sudan had been grown and gave it a thorough analysis for the basic elements and trace elements. No imbalance could be noted.

Death in the Silo

Silo-Filler's Disease (or silo gas poisoning) is another aspect of the nitrate problem. Forages high in nitrates give off nitrogen dioxide, a yellow-colored, deadly gas, for the first few days after being put in the silo. The concentration of the gas seems to be the highest the first and the third day after filling and usually by the tenth day the gas is dissipated. It is a quick and vicious killer. Exposure to it for even a few minutes can be fatal and in sublethal doses it can cause injuries which will linger for a long time. No one should enter a newly filled silo until the blower has been turned on for at least 10 minutes and the blower should be kept going all the time anyone is in the silo.

Warning of the dangers of silo gas (carbon dioxide concentration and lack of oxygen are also common silo hazards), Dr. Merle Muhrer, chairman of the University of Missouri agricultural chemistry department, says, "A person may inhale its vapors in small amounts and feel no immediate ill effects. However, before many hours have passed, edema of the lungs develops and the victim will drown in his own body fluids that have poured into the lungs. With still smaller amounts of nitrogen dioxide, the victim may apparently recover and then later have a relapse. This will cause Silo-Filler's Disease to linger for long periods before recovery or death."

Cautionary Measures

Despite the trouble high-nitrate conditions are causing, there is no reason for panic or for farmers to adopt the attitude that nitrogen should be taboo. Nor is there

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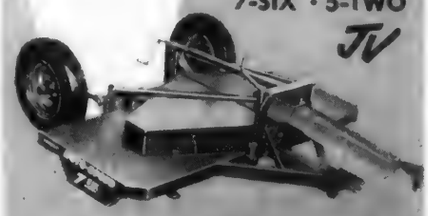

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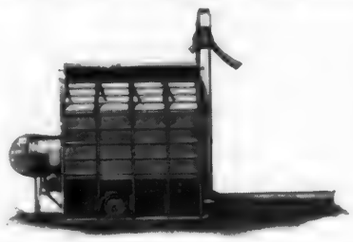

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any reason to throw undue suspicion on the kind of nitrogen that comes in bags or tanks. The nitrogen in manure can do just as much damage as the commercial kind.

The most sensible approach to the problem is to be aware of the conditions under which nitrates can cause trouble, and to know the symptoms and the measures to be taken if trouble actually breaks out. Heavy fertilization seems to have little bearing on the problem. Nitrate poisoning has cropped up under both light and heavy nitrogen applications. The condition is the result of the inter-action of the plant, the element and atmospheric conditions.

Domestic plants seem to pile up the nitrate only when they are under stress—during a drouth, or when there is insufficient sunlight—although the condition can also occur as a result of intensive cropping practices as in the case of the Palmer brothers.

If the condition is suspected, a quick way to prove the presence of nitrates in forage is by the diphenylamine qualitative test. The solution consists of diphenylamine and concentrated sulfuric acid and, needless to say, it must be handled most carefully as it is very corrosive. If nitrates are suspected in corn stalks, for example, some of the solution is dropped on a freshly cut section of the stalk; if a blue color develops rapidly, nitrate is present and probably in sufficient amounts to be dangerous. Quantitative tests to determine the exact percentage of nitrate in a plant require laboratory analysis.

The symptoms of nitrate poisoning vary. Dr. Case urges that "whenever abortions appear in herds and flocks which are free of infectious diseases, look for the possibility of a subclinical nitrate intoxication. This condition is apparently much more prevalent than is generally recognized."

Dairy cattle fall off in milk production, the coat may become coarse and rough like that of any animal at the end of a long, hard winter; one farmer described their attitude as "extremely drowsy, couldn't hardly get them up"; beef cattle will break off feed; and in the extreme cases the affected animals develop a cyanotic condition (tongue and membranes turn blue because of a lack of oxygen in the blood stream) and die. In some cases there are mixed infections: colds, pneumonia, scours, skin infections and subcutaneous swellings.

Dr. Case notes that "100 per cent of the cattle with cornstalk intoxication during the Missouri disaster in 1954, died regardless of the treatment used." In less severe intoxication, however, quiet and rest are usually very helpful and methylene blue can often be administered with good results. This is given intravenously. The solution most frequently used is 1 to 4 per cent methylene blue in a 5 per cent glucose solution or in a 1.8 per cent sodium sulfate solution. In emergency, 1 per cent

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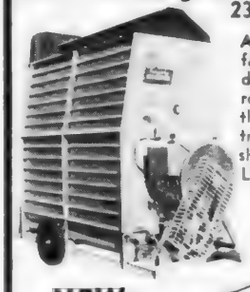

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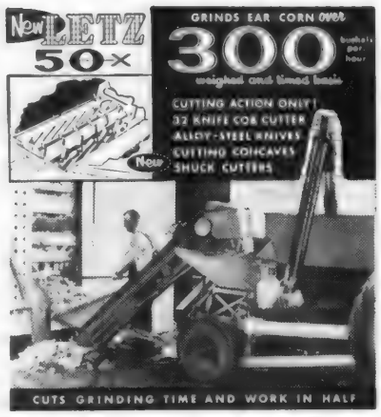

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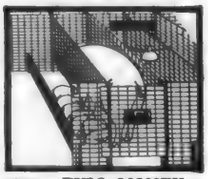

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methylene blue can be used in boiled tap water. The dosage is about 2 grams of methylene blue per 500 pounds of body weight.

The addition to the ration of a quick-acting carbohydrate like molasses is also a real help in combating the effects of excess nitrate. Under experimental conditions 12 per cent molasses in the ration has been found to counteract the effect of 4 per cent potassium nitrate equivalent. The chart on page 42 shows what happened to the production of a herd of dairy cattle which came off poor pasture in early September and were started on high-nitrate silage. Production made a quick recovery of short duration, then the herd went into a sharp and lengthy decline which was finally checked in mid-October by the addition of molasses to the diet.

Nitrates seem to tie up vitamin A, so it is a good practice to add this vitamin to the ration in nitrate cases and to increase the grain consumption if the herd has been on a high roughage diet.

Dr. Case and Dr. Muhrer ran a test on two Jersey cows which dramatically illustrates the action and counteraction of nitrates and molasses on milk production. Both cows were fed the same basal ration for five days during which cow A produced an average of almost 20 pounds per day, cow B about 11.5 pounds. Potassium nitrate at the rate of 1.25 per cent was then added to A's ration for the next five days while it was added to cow B's ration at the rate of .75 per cent. A's production fell below 14 pounds per day; B's fell to 10 pounds.

Continuing the nitrate in the ration, molasses was added for five days. While A's production moved up to about 17 pounds, B, with the lower nitrate ration, went proportionately higher to 13 pounds. Next, the molasses was taken away for five days and both cows went into a slump again. When the nitrate was discontinued both cows improved, cow B more markedly than cow A. The addition of molasses after this had little effect. After the thirtieth day of the test cow A went into a sharp decline and within two weeks was dead. Cow B, a lower producer to start with, and the one which had received the lighter dose of nitrate, aborted her calf then went on her merry way producing just about as she had before the test.

Areas that feel they might be up against a siege of nitrate trouble would do well to follow the kind of program outlined by Dr. James C. McCrea, a veterinarian who has had considerable experience along these lines in Platte County, Missouri. Dr. McCrea suggests the following steps:

"a. We run crude tests of corn stalks for nitrate. If we find a high-nitrate level we recommend keeping cattle off stalk fields. If the upper part of the stalk is not too high in nitrate we recommend turning in a week and out a week. In 1956 we tested in the laboratory hay and silage from three different parts of Platte Coun-

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World's Largest Mfgr. of Agr. Soil-Moving Eqpt.

ty. The nitrate level was not high and as a result we did not expect much trouble and really did not have much.

"b. We urge farmers to alternate corn and sorgo of different kinds and stages of growth throughout the silo and encourage those buying hay to buy from two or three different farms.

"c. Grain, molasses and vitamin A should be added to the ration in those herds where silage and hay are loaded with nitrates. The total amount of hay and silage fed should also be reduced."

CHICKEN RECORDS

(*Continued from page* 47)

to 4.3 Quality has gone up, too, with 1956 the best year when we had 87 per cent grade A.

In 1953 the net income per hen reached its highest, $2.90. In 1956 it was $2.01. I have kept strict records on the amount of time I spend on the chickens; this averages a little more than 15 hours per month, and includes the annual house cleaning, when my husband helps. From the 162 hens in the flock in 1956 my net income was $325.67, which comes out as $1.91 per hour, a pretty fair return for my spare time out here on the farm. It supplies my pocket money for the year and sometimes over, and I have a lot of satisfaction out of it, too.

We could put more automation into our operation, and we could expand with some assurance that our small operation could be multiplied many times without endangering efficiency, although disease hazards might increase with numbers. We are told that we have made an outstanding success of our small flock; we think we can do better, but for whatever success we've had, the major credit must go to record keeping.

THE AUTHOR: Pauline Harland was born and raised on a Taylor County farm, not far from the farm where she now lives. Before her marriage, she was a teacher in a one-room rural school. She is a Bible School teacher, an officer in the Women's Group of the church and a 4H club leader. She began writing three years ago on subjects which concern the life and welfare of the farm family.

THE FARM'S PICTURES

Cover by Bob and Ira Spring

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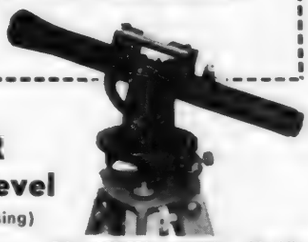

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Note the erecting *internal focusing* telescope—with rack and pinion adjustment—that makes sighting so easy—image is right side up. Fixed cross hairs in eyepiece of 10-power telescope simplify focusing. Simple telescope lock quickly makes the instrument a level. A 360 degree horizontal circle with index, is graduated to single degrees in quadrants. Positively centered 3" diameter arc reads directly to single degrees. Bearings are dust-protected. And its rugged construction means years of trouble-free service—typical of the superior quality Berger has put into its instruments since 1871.

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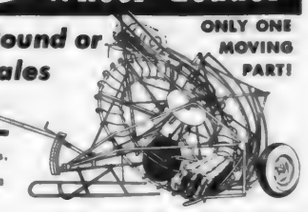
Loads Round or Square Bales on any Terrain—



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No chains, belts, engine or hydraulic. Nothing to get out of adjustment!

Large, ground driven wheel delivers bales within easy reach of operator. Wide throat automatically positions bales for pick-up. Even loosely tied bales loaded without damage. Make this lifetime investment in lower labor costs.

RUDY HOFFMAN, Herrick, S. Dak., says as far as he's concerned, the WHEEL-LOADER is the only loader made. "I loaded 30,000 bales by the first of August 1957 and have 60 days of loading to go. I like the loader." Write for free literature.

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A dime is enclosed to cover mailing costs of 20-page handbook, "BIG COW...BIG PROFIT."

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Farm Shop
by Leo Roethe

Here are two new items of special interest to all stockmen and dairymen.

New Tenite Cattle Identity tag with 40-inch nickel-steel neck chain. Jumbo numbers on bright background. Visible from a distance, non-fading. When ordering, specify numbers desired (1 to 999). State color (red, yellow, blue or white). Tag only, 65¢. Tag and chain, $1.15; per dozen, $11.95.

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OVER THE BACK FENCE
(*Continued from page* 14)

Operation Deep Freeze Cheese We had pretty well given up trying to understand what the International Geophysical Year people were trying to do until they came out recently with an item about cheese that we can comprehend. They've found a cheese buried 50 years at an old Arctic sea base used by Sir Ernest Shakelton. The cheese, an Edam, was packed in a vacuum-closed tin and neither tin nor cheese had suffered. In fact, the cheese, says the report, was "still very edible and even an excellent product for someone who likes old, full-flavored grated cheese." This ought to make the Dutch, who make Edam, feel pretty good about the durability of this product.

Have Tortoise Shell Coat. Will Travel If you are a male cat and have a tortoise shell coat and will travel, we have a dandy proposition for you. The University of California needs your help in a genetics problem. They've found out that all tortoise shell cats are female (with a very rare exception—and what few males turn up are sterile), and they want to know why. You will be enrolled in a genetics class; have all the liver and catnip you want, and will be asked to do nothing more than sire a family, a pleasant task, indeed. There may be a catch; the University doesn't say what happens to you if you fail to become a father. We advise you to think of that.

THE DAIRY BARN
(*Continued from page* 26)

differences in feed from one place to another. We make previous arrangements for all rations and beet pulp, but still the supply frequently runs out. Hay is an even bigger problem because, obviously, the same type hay cannot be purchased at each fair.

"The cattle are washed twice before they leave Belvidere and then are washed once at the start of each fair. They are, naturally, brushed before each show so their appearance will be right when they perform on the stage, but other than the washing, brushing and feeding, they are given no special attention.

"The cows are shipped from fair to fair in a semi-trailer. They are tied in the trailer and the sides of it are padded with packing blankets. In any move up to 400 miles, the cattle are hauled straight through without a stop. When the distance is greater than that, we arrange at a farm or a fairground along the way to stop and milk them out and let them lay overnight before resuming the trip. One of the most surprising things of the whole tour is how rapidly they bounce back after being hauled 500 to 700 miles across the coun-

This **2-way action** keeps teat OPEN ...speeds HEALING

Dr. Naylor Dilators promote natural milking and normal healing because they ACT TWO WAYS:

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Automatic Stock Pest Control with New Powerful Insecticide Concentrates that mix with your own water or oil.

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try. They are unloaded, filthy dirty and so gaunt they look like they can never walk again. Inside of 12 hours they fill out nicely, are back on feed and producing their normal quantity of milk. We have on occasion had a cow get bruised in transit and this is serious because that cow will not stand another move.

"During the fairs we have four shows a day, using five cows per show. Three of these cows are in the milking stalls, one each in the stanchion barns on the end of the stalls. One herdsman works the night shift and milks the cows at the same hours during the night that they are milked during the day. For example, the cows milked at the 1 P.M. show are milked again at 1 in the morning. Production and milking-time records are kept on each cow.

"The better cows in the string are bred artificially as they come in heat along the circuit. At the end of the season the entire herd is sent to one farm, where it is culled and the good cows are retained.

"The cows are real hams, so far as performing before an audience is concerned. After the first few days, kids with balloons, the footlights and the noise don't bother them at all.

"One man is responsible for the cows during the entire summer, but various men handle them from fair to fair and frequently these are men with no dairy experience. By making them stick to the rules of good milking, though, we eliminate a lot of trouble. The udders are vigorously massaged with a warm cloth to which a sanitizing agent has been added, the strip cup is used, and the machine is attached after a minute of stimulation. The cows are all trained to milk out as rapidly as possible."

Simple, isn't it? Now why can't we get old Daisy to give down when there's a stranger in the barn?

LETTERS

(*Continued from page* 10)

Reply to Mr. Benson

Sirs:

Mr. Benson's chief concern is, apparently, with the surplus, and the chief defect in his reasoning about it comes from a misinterpretation of the implications in the theorem which he, himself, lays down near the close of his article, "A farmer's income is price times volume . . ."

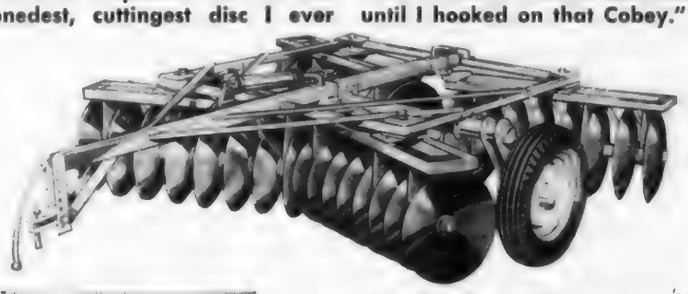
Obviously, on the basis of this, as and when farm prices drop below the farmer's steady or increasing expenses, he has but one alternative. He must increase his unit volume in an effort to bring his income back into line with his outgo. Moreover, since he works quite generally alone or with his family, this remedy is both available and applicable for him for no additional cash is involved for the extra labor.

Mr. Benson neglected to state another old-fashioned theorem which is almost axiomatic. It is a tradition among farmers that income depends on work done. The hard workers have invariably been the successes. Therefore, in practice the potential result of deliberate farm price reduction is more production, and still more as prices continue downward. The se-

"THAT COBEY HYDRA-FLEX DISC SURE SURPRISED ME"

Says Emmett Pore, Dairyman of Richland County, Ohio

I've used a lot of discs, but none can hold a candle to that Cobey Hydra-Flex. It sure surprised me. It's the doggonedest, cuttingest disc I ever saw! With finger-tip angling of front and rear gangs, it sure saves work! I never knew what a disc should be until I hooked on that Cobey."



If you are numbered among the progressive farmers — if you like to get your work done on time — then you owe it to yourself to learn more about the Hydra-Flex and its instant angling, both front and rear gangs, with only a twist of the wrist. No bolts to fuss with.

JUST A WORD ABOUT SELF-UNLOADING FORAGE WAGONS FOR THIS SUMMER AND FALL

"When it comes to Self-Unloading Forage Wagons, Cobey is tops with me. And they actually cost me less money!" — Paul Granger, Sunbury, Ohio.

Now is none too soon to get the Facts about this Outstanding Cobey buy. The coupon below will bring them to you!

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Please send me the Facts (without obligation) on:

☐ The Work-Saving Cobey Hydra-Flex Disc

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Plant pictured here easily handles 50 to 500 cattle on full feed, costs only $3,895.00, quickly pays for itself. Larger units handle up to 25,000 head.

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quence may be simply paraphrased by saying that the farmer, digging desperately to get himself out of the hole, has inadvertantly covered himself with dirt.

Mr. Benson's contention that farm troubles are due to a so-called technological explosion and to high supports is just not so. Advanced technology and modern machinery are now common to American production; but they have not wrecked industry and commerce. In fact, in that area they have provided abundance and wealth at once. Abundance is not a curse.

As for the guilt of price supports, it is literally preposterous to contend that farmers have been induced to increase production merely to get back 75 per cent, or even 90 per cent, of theoretical costs. Price supports were *not* introduced, as Mr. Benson contends, to increase production in wartime. They originated out of farm distress long before the last war and they were intended to prevent the imminent and complete collapse of agriculture. During the war they were automatically well above any levels fixed on most commodities. But in any and all circumstances, when percentage supports are manipulated and operated as a ceiling, rather than as a floor, forced surpluses are inevitable.

A final inequity, evident to all, is the fact that there are a few large operators who operate mostly on an industrial basis for whom subsidies and soil bank payments have been very profitable—running sometimes into six figures. That the cost of the farm program to the taxpayers has ballooned from one billion to five billion, while farm prices are down 14 per cent, during Mr. Benson's term is due to various factors. And finally, it seems not to have improved his competency to testify.

George D. Taylor

The Taylor Farm
Stamford, New York

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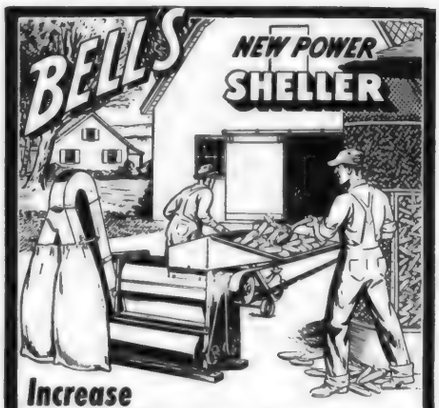

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May we send you the facts on the modern approach to beef production?

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Lathrop, Missouri Phone 500

FARM BOOKS

(*Continued from page* 16)

agribusiness as well as the nature and extent of their dealings is shown.

And what happens when we do not look at the picture as a whole? The authors point to many of our problems today to illustrate this limited vision. In the case of overproduction, for example, where everyone points to *agriculture's* inability to tailor production to consumption they show that the three elements of agribusiness are functioning at cross-purposes. The supplier elements are encouraging overproduction in most cases, the farmer element is overproducing in order to overcome the cost-price squeeze, and the processor-distributor element either encourages the overproduction or ignores the problem. The result is that the government is forced to step in with production restrictions and price supports. Only by looking at the three elements as a single economic entity can we come up with a private, voluntary procedure that will have a chance.

A popular version of this concept was incorporated in the book *Farmer In A Business Suit* by John Davis and Kenneth Hinshaw. When we reviewed that book in our Summer issue, we wished that the agribusiness concept could be given us with more meat and less pablum. Now we have the book we wished for.

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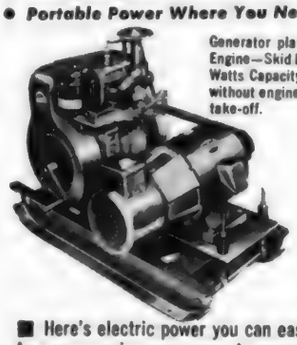

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Little House in the Big Woods, Little House on the Prairie, Farmer Boy, On the Banks of Plum Creek, By the Shores of Silver Lake, The Long Winter, Little Town on the Prairie, These Happy Golden Years, *all by Laura Ingalls Wilder. Harper & Brothers, New York. $2.95 each.*

Children should rejoice that Laura Ingalls' father was something of a wanderer for it gave his observant, sensitive daughter a chance to absorb the pioneer life of Wisconsin, Kansas, Minnesota, and the Dakotas—at a time when Kansas and the Dakotas were still Indian territory. Later, when she was in her sixties, Mrs. Wilder wrote the story of these wonderful years of her life in the form of eight novels. No other author or historian that we have ever read has equalled Mrs. Wilder in her portrayal of the log cabin, sod dugout home life or the eventful work lives of these farm people. These books are filled with the daily detail of life—the molding of bullets and cleaning and loading of the rifle, the making of soap, the carving of ox yokes, the smoking of venison, the skinning of bear, the harvesting of crops, the preserving of the winter food supply. It is also filled with the wonderful stories that Pa told, the family parties, and the simple, warm family life of the isolated farmer. No one who has read these books will ever forget the story of how the new school teacher whipped the five bullies, or how Grandpa tangled with the pig on Sunday, or how Ma slapped the bear.

Children's books are usually graded according to the age of the reader. These books are not only timeless—they are also ageless. We know of one father who is reading them to an avidly interested four-year-old, while her fifteen-year-old sister is rereading them for the sixth time—and the father finds them fascinating, too.

In thinking of a book that would make a wonderful Christmas present for a child—particularly a farm child—we felt that none could equal these, either as a set or one at a time from the *Little House in the Big Woods,* when Laura was a child, to *These Happy Golden Years,* when she reached womanhood and married.

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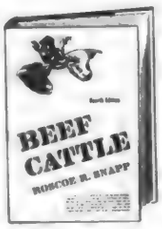

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Admiring part of a day's output are George Anderberg and the Fosters (left). After a year of operation, George Luxton decided to double the size of his Egg Factory (above). Sixty-foot extension came in a semi-trailer load.

Are Egg Factories Really Making Money?

Looking around for new income? Get the facts first . . .

"EGG PRICES are like the weather," says George Anderberg of Raymond, Ill. "You can worry about the egg market, but there's nothing you can do about it. I'm more concerned about egg production and egg quality—things that I can control." Anderberg operates a 2,900-bird Egg Factory.

"When I started farming in 1949, we were raising about 300 hogs a year," George recalls. "I was never sure how well we were doing until the hogs were sold. Now, even though we sell eggs only twice a week, we know just what we're doing from day to day." They know how many eggs are cased up, what they're worth and how much feed is used. "We've never lost money on eggs, so the future doesn't really worry us," he continued.

If you keep production up to 75 per cent, you ought to produce eggs at 15 to 18 cents a dozen with current feed and grain costs, he says. With 2,900 birds in your charge, you either coax 'em or cull 'em to get that production, too.

Until nine years ago, Anderberg had been a government customs worker in Boston. He hardly knew a chicken from an owl when he came to Illinois. As tenant on his father-in-law's 160-acre hog farm, located on the southern edge of Illinois' corn belt, George's start at farming couldn't have been more untimely. High-priced corn, low hog markets and then a three-year drouth that started in 1952.

With the drouth cutting into their corn yield, George and his wife got interested in the egg business. They asked landlord Foster for permission to build a chicken house. He not only approved but wanted to be a partner in their 625-bird venture. This was just a start, though. With a complete crop failure in 1954, Foster-Anderberg quit raising hogs and switched entirely to layers. Here's their poultry history as hen population shows it:

1949	50 hens
1950	50 hens
1951	100 hens
1952	100 hens
1953	625 hens
1954	750 hens
1955	1,750 hens
1956	2,700 hens
1957	2,900 hens

The Foster-Anderberg Egg Factory was developed as a package through a Fairbury, Ill., feed and poultry firm. The Anderbergs had been using Honegger chicks with good success for three years. But in 1952, when they purchased a prebuilt poultry house (later enlarged) they became one of the first to use Honeggers' complete Egg Factory program. This unusual plan has since meant better incomes for thousands of farm families.

This package deal includes everything but the management and the market. But they even help the poultryman cultivate the latter two. Here's what the originators of the Egg Factory idea furnish you:

HOUSING—Your Honegger Poultry House is prebuilt in easy-to-erect sections. It has been lauded as one of the most modern farm buildings in use today. The building is 28 ft. wide and available in any length. It houses 11.5 birds per foot of length.

U.S.D.A. figures show that birds may require 2 lbs. extra feed per dozen eggs when insulation and ventilation are inadequate in severe, cold weather. Proper housing versus old housing, according to leading university statistics, resulted in saving a pound of feed for every dozen eggs produced. With a 20-dozen hen, this can amount to 70-80 cents per year. Enough to pay off the entire investment in ten years or less—with feed savings alone. Extra production, livability, clean eggs—all influenced by housing—could be bankable bonus features.

BREEDING—Your production line is staffed with the finest layer bred. Honegger Layers are the national champions. They topped all breeds in the U.S. Standard Laying Test 1955-56. They average 305 eggs per bird in 350 days!

How do these birds do on the farm? Illinois Farm Bureau Management Records on 65 Honegger flocks show a five-year average of 234 eggs per hen with $3.53 profit over feed and chick cost. The records of all other flocks, for the same period, showed 185 eggs per bird and $1.37 profit. No comparison, is there?

FEEDING—Research-proven rations, developed by the nation's largest feed and hatchery organization, are supplied by your local dealer. With Big H Feeds, you are able to raise healthier birds with fewer problems. You produce more eggs at lower costs. Total feed costs of just 65 cents through to housing, for example, are reported by customers. Others have records showing feed costs of only 14 to 18 cents per dozen eggs produced. Experience and experiments with more than 20,000 hens yearly at the 600-acre Honegger Research Farm give you a feed formula that keeps your costs low and production high.

EQUIPMENT—Labor is reduced, and flock care improved, through "mechanized management" in your Egg Factory. Automatic feeders, waterers, parlor nests, refrigerated egg storage, etc., are matters of standard know-how with the originators of the packaged Egg Factory. These items can be delivered right with your building, designed specifically for it. Well-planned equipment cuts your costs, helps you sell more eggs.

Now, what about problems? Your dealer's farm serviceman, associate hatcheryman and Honegger specialist will help you. They're always on call.

Can you handle such a project? Many farm wives care for 500 to 600 birds. Some men handle a thousand-bird flock, milk cows, feed hogs and run good-sized farms without hired help.

George Luxton farms 320 acres, all rented, near Rankin, Ill. With the help of a good hired man, Henry Humphrey, Luxton, raises about 350 hogs a year and feeds some 70 head of cattle. He's kept hens ever since he started farming, raising 500 in various buildings until last year. That was when he put up a 28x64-ft. Honegger poultry house. It accommodated 650 hens (plus feed and egg rooms).

Last February, Luxton added a 60-ft. extension onto his house. He'll have 1,500 layers this year and is planning on his usual hog and cattle numbers. "I like chickens," he says, "and if I run into a help problem, I'll be able to take care of this project by myself. When you're equipped to handle them right, layers will pay you well for the time and money involved."

How about you? Are you interested in extra income? Would you like to know more about how an Egg Factory could fit into your farming picture? Just address a card or letter to Honeggers & Co., Fairbury, Ill. Full information will be provided you without obligation, of course.

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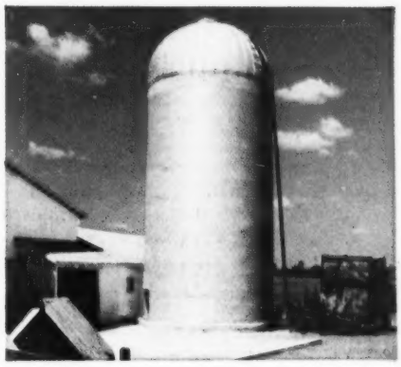

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